

**CITY OF SANTA CLARA
SOURCE REDUCTION AND
RECYCLING ELEMENT**



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**CITY OF SANTA CLARA
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TABLE OF CONTENTS**

Executive Summary

Chapter I: Statement of Goals and Objectives

Chapter II-A: Solid Waste Disposal Study

Chapter II-B: Solid Waste Characterization Study

Chapter II-C: Solid Waste Diversion Characterization

Chapter III: Source Reduction Component

Chapter IV: Recycling Component

Chapter V: Composting Component

Chapter VI: Special Waste Component

Chapter VII: Education and Public Information Component

Chapter VIII: Solid Waste Facility Capacity Component

Chapter IX: Funding Component

Chapter X: Integration Component

EXECUTIVE SUMMARY

In 1989 the California legislature passed the Integrated Waste Management Act, Assembly Bill 939 and subsequent revision bills which require local governments to reduce, reuse, recycle, or compost a portion of the waste materials that are typically disposed. Specifically, by January 1, 1995, each jurisdiction must divert at least 25 percent of its solid waste from landfills through source reduction, recycling, and composting. A 50 percent diversion level is mandated by January 1, 2000.

To help reach these goals, the City of Santa Clara is required to produce this Source Reduction and Recycling Element (SRRE), essentially its new integrated waste management blueprint. This document is a comprehensive ten-year plan outlining detailed actions which the city plans to take in response to meeting the mandated goals.

AB 939 requires that each city in California prepare, adopt, and submit to its county a SRRE that includes the following:

- a waste generation study
- a source reduction component
- a recycling component
- a composting component
- a special waste component
- an education and public information component
- a solid waste disposal facility capacity component
- a funding component
- an integration component

The integrated waste management hierarchy established by AB 939 ranks the importance of four general waste to manage and dispose of trash:

1. **Source Reduction** to reduce generation of wastes
2. **Recycling and Composting** of waste materials
3. **Environmentally-Safe Transformation** of wastes, such as incineration, distillation, and pyrolysis
4. **Environmentally-Safe Landfilling**

The City of Santa Clara's SRRE applies this hierarchy as a planning tool in the selection of programs designed to meet the 25 and 50 percent diversion goals mandated by the state.

Existing source reduction and recycling efforts in Santa Clara have resulted in diverting approximately 14 percent of the solid waste generated in the City. As further described in Chapter II, this does not include the amount of waste diverted through transformation. AB 939 specifies that transformation tonnage diversion can only be applied to the medium-term 50 percent diversion goal for the year 2000.

GOALS FOR SRRE

The primary goal of the City's SRRE is to meet the state-mandated waste diversion goals of 25 and 50 percent by 1995 and 2000, respectively. As noted above, the City is currently diverting 14 percent of its solid wastestream by a variety of programs.

The following goals have guided the development of the City's SRRE:

1. Meet or exceed state-mandated waste diversion rates through source reduction, recycling, and composting.
2. Support and encourage regional solutions to solid waste management problems.
3. Maximize recycling and composting opportunities within the City.
4. Intensify community awareness activities to maximize participation in source reduction, recycling, and composting programs.
5. Plan sufficient landfill capacity to dispose of wastes that cannot be reduced, reused, recycled, or composted.
6. Develop and expand local and regional markets for recovered materials.
7. Minimize adverse environmental impacts and ensure public health and safety.

MANDATED FORMAT OF THE SRRE

Title 14, Chapter 9 of the California Code of Regulation (CCR) specifies the required substance and format of the SRREs to be prepared by each city and county in California. The components of the SRRE that address source reduction, recycling, composting and special wastes must contain the following sections:

- Objectives
- Existing Conditions Description

- Evaluation of Alternatives
- Program Implementation
- Monitoring and Evaluation

The regulations dictate that the alternative programs considered for these four components must be evaluated in accordance with ten criteria that reflect a wide range of technical, economic, institutional and socio-political issues.

The remaining four components of the City's SRRE, education/public information, disposal facility capacity, funding, and integration, deviate somewhat in format from the first four, as will be noted from a review of the SRRE. The apparent lack of consistency in the format is thus dictated by the regulations for Planning Guidelines and Procedures for Preparing and Revising Countywide Integrated Waste Management Plans (Title 14, CCR, Division 7, Chapter 9, Articles 3, 6.1, 6.2, 7, and 8).

CONCLUSION

Faced with remaining disposal capacity at the All Purpose Landfill of less than 2 years, and long-term landfill capacity through a disposal agreement with the Newby Island Landfill until 2019, new and expanded programs will reduce the City's dependence on available landfill space.

Expanded source reduction activities are planned to prevent materials from entering the solid wastestream as described in Chapter III. These activities will require a vigorous public education campaign which would include advice on how to select longer lasting or recyclable products and participating in reuse programs through purchasing and donating items for reuse.

Other related issues would also be addressed in the public awareness component, Chapter VII, including procurement policies, home and on-site composting, volume-based user fees for refuse collection; and ordinances restricting certain materials from disposal at local solid waste facilities.

An expanded recycling program is also planned as described in Chapter IV, Recycling. The existing residential recycling program would be expanded to include more multi-family dwellings, more types of recyclable materials in collection programs for all residences, continuing volume-based user fees for refuse collection, expanded public information and education, and assistance for the commercial sector. The program would include a combination of curbside collection, drop-off centers, buy-back centers, the operation of private materials recovery facilities to process recyclables, and expanded commercial and industrial area sector recycling.

Particular emphasis will be placed on commercial recycling and composting of yard wastes. Waste from the City's commercial and industrial sectors contributes to over 75

percent of the solid waste generated in the City (Chapters II and IV). The commercial recycling program is based primarily on: structuring refuse collection rates to encourage source reduction and recycling; outreach and technical support to businesses and institutions to participate in waste audits, and to pro-actively plan to achieve goals set by the City on a site-specific or business category basis. The pro-active approach can include workshops for specific industries where peers describe ways that they have established recycling and waste reduction programs and the advantages, such as money savings, of doing so.

A composting program (Chapter V) for all sectors will probably be needed to meet the State's mandated diversion goals. The compost program calls for curbside collection of source-separated yard waste from single-family households (a modification of the existing Rubbish Collection Program) and encouragement of the use of a drop-off site or sites by commercial haulers and generators; using a centralized processing facility; providing public education and promotion; providing program incentives through volume-based fee structures; and using or marketing the end products as soil amendments or possibly as fuel.

Special wastes, including tires, construction and demolition debris, white goods and appliances, and other materials, do not constitute a large percentage of the City's wastestream. However, special wastes will be targeted for diversion by expanding existing salvaging programs at transfer stations and landfills (Chapter VI).

A comprehensive education and public information program will help create a successfully-integrated waste management program in Santa Clara (Chapter VII). Besides building on increasingly widespread awareness of environmental and solid waste issues, the public education program will create broad visibility for the source reduction and recycling program. Manuals and visual aids will help motivate increased participation by residential and business sectors. And, just as critical, are public awareness techniques to increase awareness of avoiding excess or non-recyclable packaging as well as buying recycled and composted materials.

As described in the Funding Chapter IX, the City will research and probably apply for state market development block grants as well as other available funds to be applied to market development of recycled products and services. The City intends to seek additional funds by considering revisions of the existing refuse rate system and landfill tipping fees. Opportunities put in place by AB 939 for supplemental funding to help offset these costs will be evaluated.

The source reduction, recycling, composting and special wastes components will be integrated as described in Chapter X, so that the programs selected for implementation from each component achieve the maximum potential for diverting solid wastes from landfills.

A summary of the schedule of programs to be implemented and the funding required are presented on Tables ES-A and ES-B.

Table ES-A

**Short-Term Integration Schedule for
the City of Santa Clara**

Component	Responsible Agency	Implementation Date
Source Reduction	City	1991 – 1995
Recycling		
Continue Existing Programs	All Parties	1991 – 1995
Expand Residential Curbside	City/Hauler	1992 – 1995
Expand Multi-family Service	City/Hauler	1992 – 1995
Legislative Support/Market Development	City	1991 – 1995
Expand City Office Recycling Program	City	1991 – 1995
Awards and PR Program	City	1991 – 1995
Voluntary Submission of SRRE by Businesses	Businesses	1993 – 1995
Code Modifications	City	1992 – 1995
Evaluate User Fees	City	1994 – 1995
Promote Commercial Recycling	City	1991 – 1995
Composting		
Residential Curbside Collection – Yard/Wood Waste	City	mid-1993 – 1995
Landfill/Private Site Drop-off & PR Program	All parties	1991 – 1995
Encourage Regional Compost Facilities	City	1992 – 1995
Encourage Compost Marketing Programs	City	1993 – 1995
Special Wastes		
Continue Existing Programs	All parties	1991 – 1995
Divert Tires from Landfilling	All parties	mid-1991 – 1995
Process White Goods	All parties	1992 – 1995

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
A. SOURCE REDUCTION								
1. Backyard Composting Promotion and Education (2)	GF	\$0	FY 93-94	\$0	\$0	\$500	\$500	\$500
2. Business and Consumer Education Programs (2)	GF	\$0	FY 92-93	\$0	\$2,000	\$4,000	\$4,000	\$4,000
3. Awards and Public Recognition (2)	GF	\$0	FY 91-92	\$500	\$500	\$500	\$500	\$500
4. Expansion of City Offices Source Reduction Program (2)	GF	\$0	FY 91-92	\$250	\$250	\$250	\$250	\$250
5. Request for Commercial Waste Reduction Plans (2)	GF	\$0	FY 93-94	\$0	\$0	\$1,250	\$1,250	\$1,250
6. Program Evaluations of Variable Can Rate (4)	GF	\$0	FY 95-96	\$0	\$0	\$0	\$0	note (4)
7. Procurement Policy and Legislative Support (4)	GF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
B. RECYCLING								
1. Expand Residential Curbside Recycling Program Materials (5)	DC, AB	\$0	FY 91-92	note (5)	note (5)	note (5)	note (5)	note (5)
2. Expand Multi-Family Residential Recycling Program (8)	DC, AB	\$0	FY 92-93	\$0	\$20,000	\$20,000	\$20,000	\$200,000
3. Legislative Support (4)	GF	\$0	FY 92-93	note (4)	note (4)	note (4)	note (4)	note (4)
4. Market Development (2)	GF	\$0	FY 93-94	\$0	\$0	\$500	\$500	\$500
5. City Office Recycling Program Expansion (2)	GF, AB	\$0	FY 92-93	\$0	\$500	\$500	\$500	\$500
6. Awards and Public Recognition Program (8)	AB, GF	\$0	FY 91-92	\$500	\$500	\$500	\$500	\$500
7. Voluntary Submission of SRRE By Businesses (2)	GF	\$0	FY 93-94	\$0	\$0	\$2,000	\$2,000	\$2,000
8. Evaluate Planning and Building Code Modifications (4)	GF	\$0	FY 94-95	\$0	\$0	\$0	note (4)	note (4)
9. Evaluate Feasibility of Quantity-Based User Fees (4)	GF	\$0	FY 95-96	\$0	\$0	\$0	\$0	note (4)
10. Promote Commercial Recycling (2)	GF	\$0	FY 91-92	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96

C. COMPOSTING

1. Residential Yard Waste/Rubbish Collection Program (4)	GF, DC	\$0	FY 93-94	\$0	\$0	\$0	note (4)	note (4)
2. Support Programs								
a. Marketing (2)	GF, AB	\$0	FY 92-93	\$250	\$250	\$500	\$500	\$500
b. Public Education (2)	GF, AB	\$0	FY 91-92	\$250	\$250	\$5,000	\$5,000	\$5,000
c. Feasibility Studies (2)	GF, AB	\$0	FY 95-96	\$0	\$0	\$0	\$0	\$0

D. SPECIAL WASTES

1. Abandoned Vehicle Abatement Program (2)	GF	\$0	FY 91-92	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
2. Divert Tires from Landfill (6)	LF	\$0	FY 91-92	\$50,000	\$100,000	\$150,000	\$200,000	\$300,000
3. Process White Goods (6)	LF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
E. HOUSEHOLD HAZARDOUS WASTE								
1. Periodic Drop-Off Events (2)	DC, G	\$0	FY 91-92	\$130,000	\$130,000	\$130,000	\$130,000	\$130,000
2. Mobile & Permanent Drop-Off Facility – Countywide Program Santa Clara Participation (2)	DC, G	\$0	FY 91-92	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
3. Curbside Used Motor Oil Collection Program (2)	DC, G	\$0	FY 91-92	\$23,000	\$23,000	\$23,000	\$23,000	\$23,000
4. Hazardous Waste Exclusion Program at Landfill (2)	GF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)
5. HHW Recycling		\$0	(Cost included in item 1 and 2 above)					
F. PUBLIC EDUCATION & INFORMATION		\$0	FY 91-92	(Costs included in other elements)				

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
G. TOTALS								
Sub-total Current Funded Programs		\$0		\$229,250	\$281,750	\$343,000	\$393,000	\$493,000
Sub-total New Programs (unfunded)		\$0		\$500	\$20,500	\$20,500	\$20,500	\$200,500
Grand Totals		\$0		\$229,750	\$302,250	\$363,500	\$413,500	\$693,500

NOTES:

1. Costs are shown only for new and expanded programs identified in Sections III through VIII (Costs in 1991 dollars).
2. Costs included in City's General Fund Operating Budget for FY 1991-92.
3. Capital costs are not amortized.
4. Included in City's General Fund Operating Budget prior to FY 1991-92.
5. Operating costs are included in existing curbside operation program.
6. Included in landfill tipping fees.
7. Funding source availability schedule is July 1 each fiscal year for the funding mechanism noted. Exceptions are grants and AB 939 fees which are considered supplemental offset funding to Direct Charges and General Fund mechanisms which are typically received after the expenditures.
8. Countywide AB939 beginning FY 92-93

FUNDING MECHANISM LEGEND:

AB: AB 939 per ton charge at landfill on City disposed refuse.

B: Bonds

DC: Direct charge to customer receiving service

G: Grants

GF: General Fund

L: Loans

LF: Landfill tipping charge by landfill operator

UF: User fees spread over entire refuse collection charge rate base

Table ES-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
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CHAPTER I STATEMENT OF GOALS AND OBJECTIVES

INTRODUCTION

In order to ensure that California's solid waste is managed in an effective and environmentally sound manner, State Assembly Bill 939 (AB 939) was signed into law on September 29, 1989, thereby enacting the California Integrated Waste Management Act of 1989. This bill is an essential part of the State's comprehensive program for solid waste management.

AB 939 addresses a wide range of issues dealing with the management of solid waste materials. The bill establishes the California Integrated Waste Management Board (CIWMB) and requires the preparation of countywide integrated waste management plans. It also requires all municipalities to divert 25 percent of their solid waste from landfill disposal through source reduction, recycling, and composting, by January 1, 1995. By the year 2000, 50 percent of the wastestream must be diverted.

Assembly Bill 1820 amends certain portions of AB 939. These modifications and the implementing regulations are now being finalized as a part of Title 14 by the CIWMB which sets forth guidelines and procedures for preparing the countywide plans.

This chapter presents a summary of the goals and objectives designed to assist the City of Santa Clara in meeting the mandated source reduction and recycling goals.

A. SOURCE REDUCTION GOALS

Source reduction refers to any action which causes a net reduction in the generation of solid waste, and can include, but is not limited to, replacing disposable materials and products with reusable materials and products, reducing packaging, and increasing the efficient use of paper, cardboard, glass, metal, plastic, and other materials in the manufacturing process. Although individual source reduction measures are difficult to quantify and document, the cumulative effect of several such measures, in conjunction with an effective recycling program could significantly reduce the volume of solid waste going to disposal facilities. A source reduction program will also conserve energy, avoid collection and disposal costs, increase public awareness of waste disposal issues, and contribute to the overall success of solid waste management plans.

The short-range objectives of the City's program are to educate the public about source reduction activities and modify city procurement policies. The education and public information program will distribute informative flyers about specific source reduction activities that residents and office personnel can perform as well as the benefits that will

be derived from such activities. Where feasible, all city offices will purchase recyclable over non-recyclable materials, products with minimal packaging over products with excessive packaging, and reusable products over disposable products.

The medium-range objective is to encourage source reduction behavior through a broad based program that incorporates instructional and promotional alternatives, economic incentives and rate structure modifications, waste exchanges, city leadership and regulatory programs.

B. RECYCLING

The recycling program developed and implemented by the City of Santa Clara will form the cornerstone for achieving the 25 and 50 percent diversion goals established by AB 939. Recycling programs provide the most effective way to divert large quantities of material from disposal facilities. By meeting the following objectives, the City can expect to divert a variable percentage of its total wastestream.

Short-term objectives (by 1995):

- Increase participation in residential recycling programs, especially programs for multi-family dwellings.
- Increase participation in the commercial recycling program.
- Increase the types of materials collected from the commercial sector.
- Establish a diversion program for materials currently collected via industrial debris boxes.
- Increase diversion of inert solids generated by the City's Department of Public Streets and Traffic, municipal utilities, construction, and capital improvement projects.
- Increase local markets for materials made from post-consumer waste.
- Modify reuse collection practices to optimize the economics of recycling operations.

Medium-term objectives

- Increase separation of mixed paper from the commercial wastestreams.
- Increase local markets for materials made from post-consumer waste.

- Increase plastics recycling operations to include a wider variety of polymer types.
- Continue programs implemented in the short-term planning period.

C. COMPOSTING

Composting will also be a critical component for achieving the mandated 25 and 50 percent diversion goals. It is a very effective way to divert yard and selected organic wastes away from disposal facilities. These types of waste comprise a large part of the wastestream (11 percent overall and 28 percent of the residential wastestream).

The short-term composting objective for the City of Santa Clara is to compost at least 25 percent of the commercial and residential yard and wood wastestream. The medium-range composting objective for the City is to remove at least 50 percent of the commercial and residential yard and wood wastestream. Establishing end-users will be a major factor in the ultimate success of the composting program. Medium-term marketing activities for the City include using the resulting soil amendment on City grounds and supplying existing distributors with quality materials.

D. SPECIAL WASTE

Special waste refers to any waste which has been classified as a special waste pursuant to Section 66744 of Title 22 of the California Code of Regulations, or which has been granted a variance for the purpose of storage, transportation, treatment, or disposal by the Department of Health Services pursuant to Section 66310 of Title 22 of the California Code of Regulations. Special waste also includes any solid waste which is specifically conditioned in a solid waste facilities permit for handling and/or disposal, because of its source of generation, physical, chemical, or biological characteristics, or unique disposal practices.

Examples of special wastes include, but are not limited to, the following:

- Asbestos
- Sewage sludge
- Tires
- White goods
- Abandoned vehicles
- Dead animals

Objectives for management of special wastes include the following:

- Continue existing programs that divert recyclable special wastes from landfilling.
- Continue to provide for environmentally safe management or disposal of special wastes that cannot be recycled.
- Increase recovery of recyclable special wastes from the solid wastestream.

E. EDUCATION AND PUBLIC INFORMATION

There are many ways to increase public awareness of, and participation in, recycling, source reduction, and composting projects. The best overall strategy is a comprehensive mix of techniques, including:

- Public Education
- Promotions and events
- Publicity and reminders

Short-term objectives build upon existing programs and include:

- Expanding existing public education and information programs to address source reduction, composting, recycling, and household hazardous waste, tailored to the residential and commercial and industrial sectors.
- Creating public involvement opportunities through recycling promotions and events.
- Providing residents with detailed information for participation in local collection programs.
- Educating the public about the uses of recycled and composted materials, emphasizing "closing the loop" through a "buy recycled" campaign.
- Cultivating support by publicizing and encouraging involvement of the business community.
- Participating in countywide public education efforts.

Medium-term objectives build upon short-term objectives and will focus upon:

- Expanding existing programs.
- Revising and improving current efforts based on feedback obtained from evaluation of short-term activities.
- Developing new programs to target specific sub-populations or wastestreams.

F. SUMMARY OF DIVERSION ACTIVITIES

The programs and activities for the short-term planning period, when implemented, are projected to achieve a 33 percent reduction of the wastestream in 1995. The medium-term planning period will exceed the 50 percent diversion rate through the programs described in the SRRE.

CHAPTER II SOLID WASTE GENERATION STUDY

Introduction

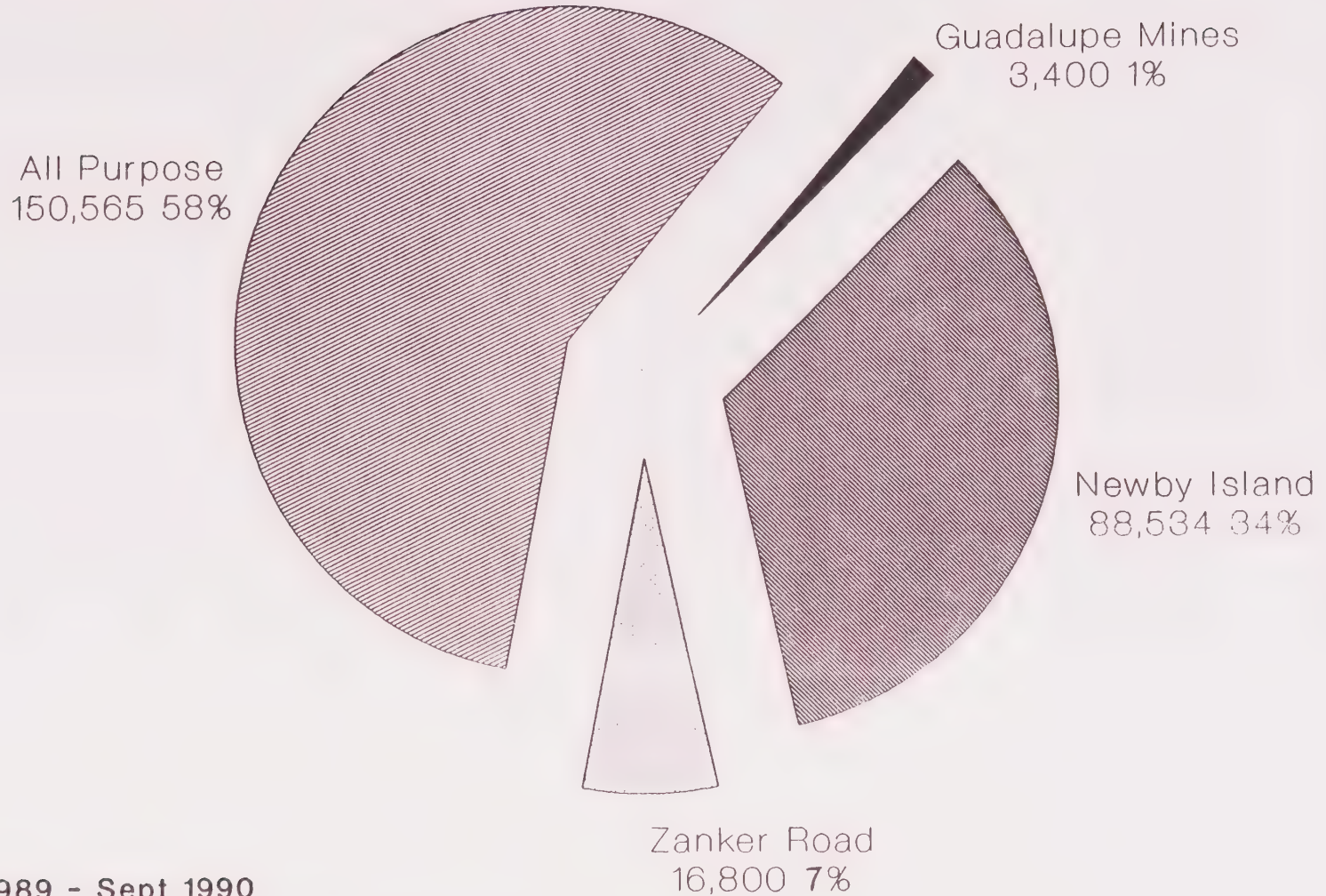
Chapter II is divided into three parts as follows:

- II-A Solid Waste Disposal Study
A compilation of tonnages, haulers, and sources of wastes records.
- II-B Solid Waste Characterization Study
A detailed characterization of the waste material disposed was done for the City by Recovery Sciences, Inc. The report is included in its entirety, herein.
- II-C Solid Waste Characterization
Efforts to identify and quantify the amount of solid waste diverted from landfilling is discussed.

CHAPTER II-A SOLID WASTE DISPOSAL STUDY

From landfill operator records for the period from October 1989 through September 1990 tonnages delivered were identified by hauler and source. The results are shown in Table II-A.1. A total of 259,299 tons was delivered for disposal during this period. From the amount delivered, material was salvaged at the landfill site and is identified later in Chapter IV. Figure II-A and II-B present summarized tonnages for the 12-month period and the landfills to which the waste was delivered.

Solid Waste Disposed (Tons)/ Landfill Sites Used



Oct 1989 - Sept 1990

259,299 TONS TOTAL

**All Purpose Landfill -- Tonnages
City of Santa Clara, Oct. 1989 - Sept. 1990
150,565 TONS TOTAL**

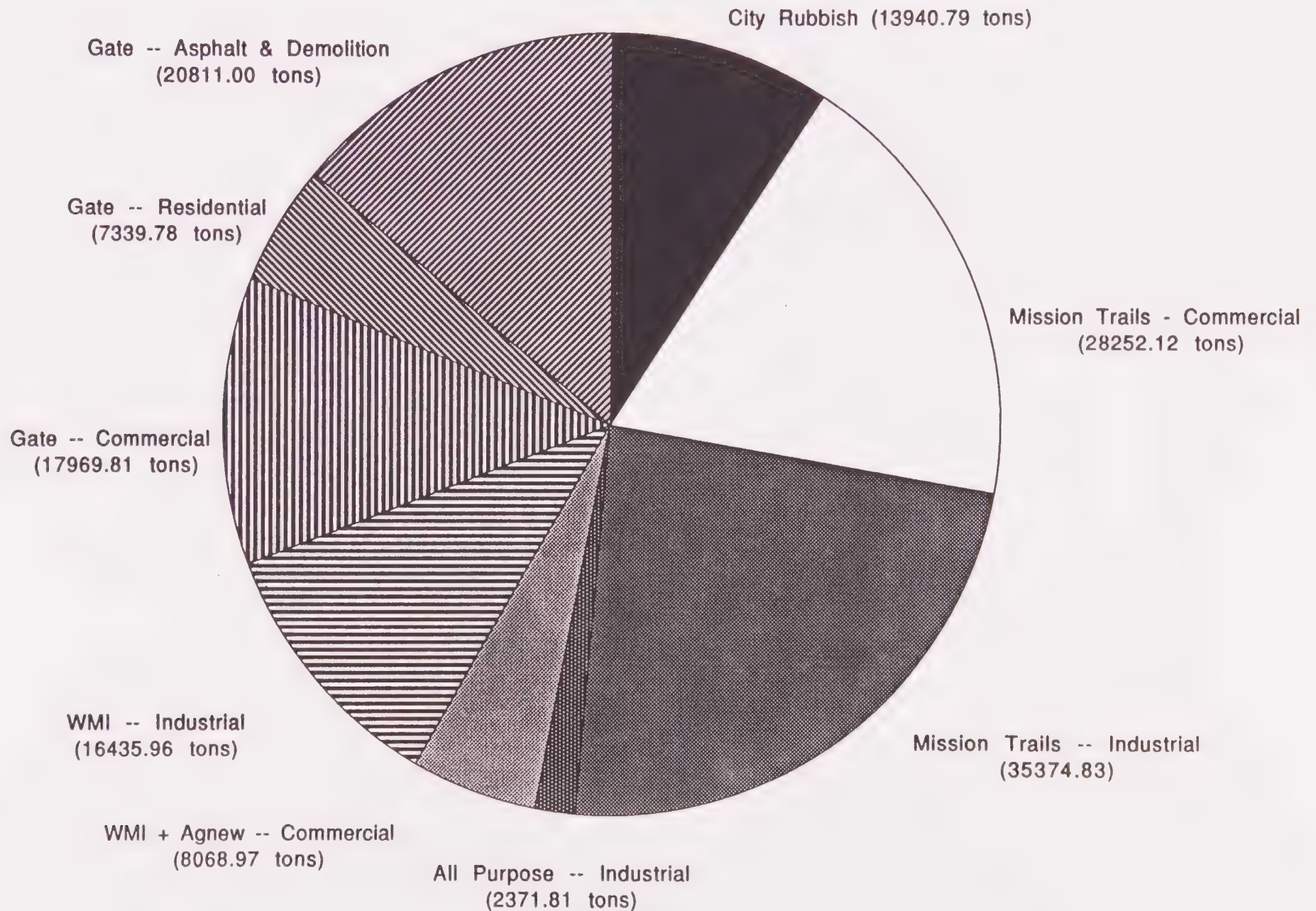
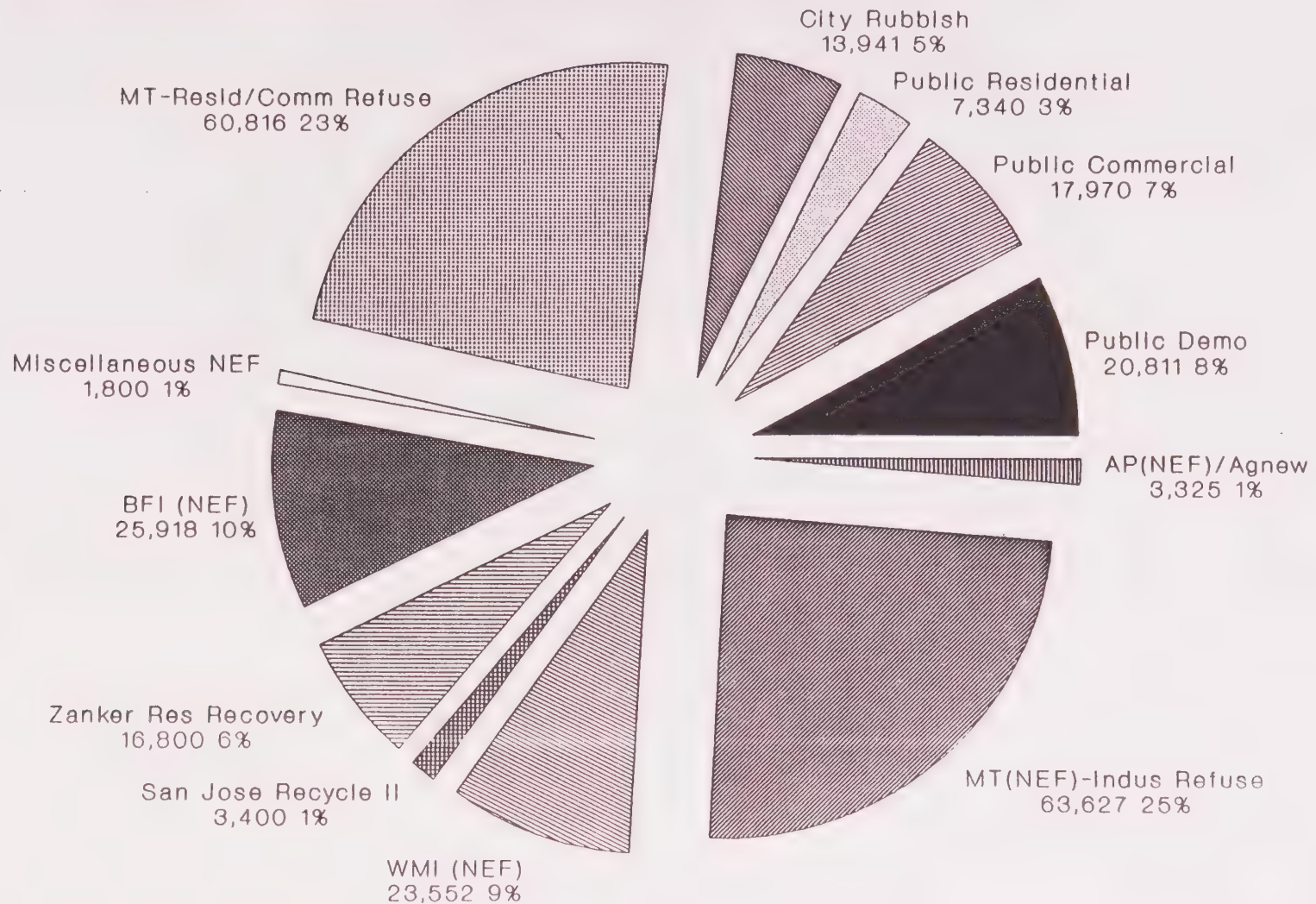


FIGURE II-A

Solid Waste Collected Tonnages and Refuse Hauler



Oct 1989 - Sept 1990

TABLE II-A.1 (pg. 1 of 3)

CITY OF SANTA CLARA ANNUAL WASTE GENERATION TONNAGES

<i>All Purpose Landfill Tonnages(*1, *2)</i>
--

Hauler	City Rubbish	Mission Trails Commercial	Mission Trails Industrial	All Purpose Industrial	WMI + Agnew Commer.(*3)	WMI Industrial	Gate Commercial	Gate Residential	Gate Asphalt & dem.
Oct-89	1344.00	2549.00	2961.00	229.00	257.00	1681.00	1776.42	725.58	978.00
Nov-89	1314.00	2536.00	2368.00	210.00	233.00	1650.00	2029.18	828.82	557.00
Dec-89	1147.00	2700.00	2196.00	206.00	279.00	1323.00	1745.18	712.82	522.00
Jan-90	1147.00	2690.00	2710.00	211.00	749.00	1136.00	1598.92	653.08	766.00
Feb-90	923.00	1574.00	2318.00	146.00	855.00	1088.00	1455.50	594.50	866.00
Mar-90	1330.00	1929.00	2958.00	141.00	920.00	1243.00	1683.41	687.59	4759.00
Apr-90	1308.00	1889.00	2609.00	134.00	830.00	1215.00	1529.34	624.66	7240.00
May-90	1000.00	2283.00	2970.00	201.00	840.00	1435.00	1477.51	603.49	1053.00
Jun-90	1126.00	2514.00	3182.00	279.00	675.00	1691.00	1632.29	666.71	1482.00
Jul-90	1140.62	2697.67	3927.80	239.95	768.24	1184.67	1207.32	493.13	1005.00
Aug-90	1169.21	2673.16	4508.41	218.07	759.65	1379.16	924.37	377.56	907.00
Sep-90	991.96	2217.29	2666.62	156.79	903.08	1410.13	910.37	371.84	676.00
TOTAL	13940.79	28252.12	35374.83	2371.81	8068.97	16435.96	17969.81	7339.78	20811.00
% of total	5.38%	10.90%	13.64%	0.91%	3.11%	6.34%	6.93%	2.83%	8.03%

150,565 TONS TOTAL

TABLE II-A.1 (pg. 2 of 3)

Newby Island Landfill Tonnages

Hauler	BFI		
	Commercial	Industrial	Total
7/89-6/90	5634.56	20283.70	25918.26
% of total	2.17%	7.82%	10.00%

Mission Trails(*4)

	Residential	Multi-Family	Commercial	Total
Aug-89				
Sep-89	1353.40	2265.48	2265.48	5884.35
Oct-89	1183.38	1980.88	1980.88	5145.14
Nov-89	1206.81	1996.10	1996.10	5199.00
Dec-89	1321.08	1890.03	1890.03	5101.13
Jan-90	1168.79	1639.47	1639.47	4447.73
Feb-90	1181.41	2126.71	2126.71	5434.82
Mar-90	1041.40	2209.60	2209.60	5460.60
Apr-90	1140.95	2131.82	2131.82	5404.59
May-90	1072.81	1788.87	1788.87	4650.55
Jun-90	1192.99	1752.96	1752.96	4698.90
Jul-90	1145.13	1771.91	1771.91	4688.95
	1190.50	1754.79	1754.79	4700.07

Total M.T.

% of total	14198.65	23308.59	23308.59	60815.83
	5.48%	8.99%	8.99%	23.45%

Misc. NEF(#4)

	Commercial	Industrial	Total
7/89-6/90			
% of total	0.00	1800.00	1800.00
		0.69%	0.69%

San Jose Transfer Station/ Guadalupe Landfill(*7)
--

S.J. Recy II	Commercial	Industrial	Total
Total			
% of Total	0.00	3400.00	3400.00
		1.31%	1.31%

Zanker Road Landfill Tonnages(*6)
--

Total	
% of total	16800.00
	6.48%

TOTAL CITY TONNAGES

	Residential	Multi-Family	Commercial	Industrial	Total
					259299.16
	35479.22	23308.59	83234.05	117277.30	
% of Total	13.68%	8.99%	32.10%	45.23%	100.00%

TABLE II-A.1 (pg. 3 of 3)

*Notes

1. City Rubbish is classified as residential waste.
2. All commercial waste is compacted waste. All industrial waste is uncompacted waste. The one exception is waste hauled to the All Purpose Landfill gate. Gate commercial waste is assumed to be 71% of the total uncompacted waste brought to the gate by independent haulers and private citizens. Gate residential waste is 29% of the total uncompacted waste hauled to the landfill gate.
3. Agnew Hospital Tonnage is classified as commercial (institutional) and amounted to 953 tons over the period qualified.
4. Residential waste hauled by Mission Trail Waste Systems is waste from rear and side loaders. Multi-family and commercial waste each comprise one-half of the total waste from front loaders.
5. The miscellaneous NEF tonnage at Newby Island is classified as industrial waste hauled by several non-exclusive franchise haulers. (All Trash Co., South Bay Disposal, and Butterick Enterprises). The estimate of waste is based on gross receipts conversion factor.
6. The Zanker Road tonnages are classified as industrial waste. The tonnage figure is an estimate by Jesse Weigel of Zanker Road Resource Recovery Systems.
7. San Jose Transfer Station/Guadalupe Mines Landfill tonnages are classified as industrial waste hauled by San Jose Recycling II, a non-exclusive franchise hauler. The estimate of waste is based on gross receipts conversion factor.

CHAPTER II-B

City of Santa Clara Waste Characterization Study

March 21, 1991

Prepared for the City of Santa Clara
Santa Clara, California

by

Recovery Sciences, Inc.
Del Mar, California

In Association With

EcoAnalysis, Inc.
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City of Santa Clara Waste Characterization Study

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Bob Smith, Laura Riege, and Brock Bernstein of EcoAnalysis, Inc. conducted statistical analyses to ensure that the highest quality data are presented here.

This study was submitted in fulfillment of Purchase Order No.A34815 by Recovery Sciences, Inc. under contract with the City of Santa Clara. Work on this study was completed in December 1990.

DISCLAIMER

The statements and conclusions of this report are those of the contractor (and subcontractors) and not necessarily those of the City of Santa Clara. The City of Santa Clara makes no warrant, express or implied, and assumes no liability for the information contained in the following text.

Table of Contents

LIST OF TABLES	v
LIST OF CHARTS	vii
SECTION A: HISTORY OF SAMPLING PROTOCOL DEVELOPMENT	1
1. Introduction.....	1
2. Overview of Sampling Protocol	1
2.1 Development of Sampling Design for Manually Sampled Sub-Wastestream	2
2.1.1 <i>Number of Samples Collected per Truck</i>	
2.1.2 <i>Number of Vehicles to Sample per Truck Type</i>	
2.1.3 <i>Sample Collection Procedure</i>	
2.2 Development of Sampling Design for Observationally Studied Sub-Wastestream	5
SECTION B: DESCRIPTION OF SAMPLING STUDY	7
1. Overview	7
1.1 Sample Collection Procedure	7
2. Design for Manually Sampled Sub-Wastestream	7
2.1 Sampling Design	7
2.1.1 <i>Wastestream Stratification</i>	
2.1.2 <i>Number of Samples to Collect per Sub-Wastestream</i>	
2.1.3 <i>Number of Vehicles to Sample per Sub-Wastestream</i>	
2.1.4 <i>Vehicles Sampled</i>	
2.1.5 <i>Tonnage Basis for Sampling Period</i>	
2.1.6 <i>Sorting Categories</i>	
3. Design for Observationally Sampled Sub-Wastestream	10
3.1 Sampling Design	10
3.1.1 <i>Wastestream Stratification</i>	
3.1.2 <i>Load Classification</i>	
3.1.3 <i>Sampling Collection Procedure</i>	

SECTION C: STATISTICAL METHODS FOR THE MANUALLY SAMPLED SUB-WASTESTREAM	13
1. Overview	13
1.1 Weighting of Overall Means	13
1.1.1 Overall Means	
1.1.2 Individual Strata	
2. Stratification	14
2.1 The Advantage of Stratification	14
2.2 The Choice of Strata	15
2.3 Computation of Means with Stratified Data	15
2.4 Computation of Confidence Regions of the Means with Stratified Data	16
2.5 Allocation of Samples to the Strata	17
3. Estimation of Sampling Effort needed for Desired Confidence Bounds	18
4. Determining the Optimal Number of Samples per Truck	18
4.1 The Sampling of Trucks	18
4.2 Optimization Analysis	18
5. Calculation of Confidence Intervals	19
 SECTION D: RESULTS	 21
1. Overview	21
1.1 Overall Results	21
1.2 Trucks Sampled	24
2. Manually Sampled Sub-Wastestream Results	26
2.1 Commercial Sub-Wastestream	26
2.2 Industrial Sub-Wastestream	28
2.3 Multi-family Sub-Wastestream	30
2.4 Residential Sub-Wastestream	32
2.5 City Rubbish Sub-Wastestream	34

3. Observationally Studied Sub-Wastestream	36
3.1 Sampling Results	37
APPENDIX	39
Appendix A: Sorting Category Definitions for City Manually Sampled Sub-Wastestream	41

List of Tables

Table A-1: Optimization Results—Optimal Number of Quadrats per Truck	4
Table B-1: City of Santa Clara Manually Sampled Sub-Wastestream Truck Types	8
Table B-2: Sources of Waste Within Truck Type	8
Table B-3: Number of Vehicles to Sample per Sub-Wastestream	9
Table B-4: Sorting Categories for Waste Components	10
Table B-5: Observationally Studied Waste Stratification (December 1990)	10
Table B-6: Classification of Observationally Studied Waste Loads	11
Table B-7: Observationally Studied Waste Process	12
Table C-1: Effect of Stratification on Precision of Estimation of the Means	14
Table C-2: Data for Contaminated Film Plastic	17
Table C-3: Confidence Intervals Using the Percentile Bootstrap Method	20
Table D-1: Strata Tons and Percentages for the City of Santa Clara	21
Table D-2: Overall Means and Confidence Limits for the City of Santa Clara, November, 1990	22
Table D-3: Trucks Sampled at All Purpose Landfill, City of Santa Clara, November, 1990	25
Table D-4: Stratum Means and Confidence Limits for the Commercial Sub-Wastestream, City of Santa Clara, November 1990	26
Table D-5: Stratum Means and Confidence Limits for the Industrial Sub-Wastestream, City of Santa Clara, November 1990	28
Table D-6: Stratum Means and Confidence Limits for the Multi-family Sub-Wastestream, City of Santa Clara, November 1990	30

Recovery Sciences, Inc. & EcoAnalysis, Inc.
City of Santa Clara Waste Characterization Study

Table D-7: Stratum Means and Confidence Limits for the Residential Sub-Wastestream, City of Santa Clara, November 1990	32
Table D-8: Stratum Means and Confidence Limits for the City Rubbish Sub-Wastestream, City of Santa Clara, November 1990	34
Table D-9: Trucks Sampled at All Purpose Landfill for the Observationally Studied Sub-Wastestream, December 7, 1990	36
Table D-10: Observationally Studied Load Classifications, City of Santa Clara, December 7, 1990	38

List of Charts

Chart A-I: City Total Wastestream 1990 (by Stratum Type)	3
Chart D-I: Overall Means, City of Santa Clara, November 1990	23
Chart D-II: Stratum Means, Commercial Sub-Wastestream, City of Santa Clara, November 1990	27
Chart D-III: Stratum Means, Industrial Sub-Wastestream, City of Santa Clara, November 1990	29
Chart D-IV: Stratum Means, Multi-family Sub-Wastestream, City of Santa Clara, November 1990	31
Chart D-V: Stratum Means, Residential Sub-Wastestream, City of Santa Clara, November 1990	33
Chart D-VI: Stratum Means, City Rubbish Sub-Wastestream, City of Santa Clara, November 1990	35

SECTION A: HISTORY OF SAMPLING PROTOCOL DEVELOPMENT

1. INTRODUCTION

Recovery Sciences, Inc. (RSI) has developed sampling protocol for waste characterization studies from over twenty-five separate landfills since 1986. This protocol results in an accurate representation of a City or County wastestream using a minimum number of samples.

Prior to the actual sampling, the City of Santa Clara's records were analyzed to determine the overall tonnage of waste produced by the City. This tonnage figure was then broken down to determine the percent of the City's waste brought to the All Purpose and Newby Island Landfills by all haulers in the area. The total City tonnage was also categorized into four sub-wastestreams: Residential (from single-family dwellings); Multi-family (from multi-family units and apartment buildings); Commercial (from small to medium-sized businesses); and Industrial (from large manufacturing firms, and demolition and construction sources).

Using the percentages of each sub-wastestream type, RSI then calculated the number of samples required to determine a representative picture of the City's wastestream. RSI worked with City staff and local haulers to determine these percentages and sub-wastestream classifications.

2. OVERVIEW OF SAMPLING PROTOCOL

The sampling occurred during two periods at the All Purpose Landfill in Santa Clara. Haulers that normally dispose at the Newby Island Landfill were diverted to All Purpose Landfill if their trucks were chosen for sampling. During the first sampling period, November 12 to 15, 1990, RSI conducted manual sampling. Manual sampling involved sorting waste samples into thirty-four separate types, which are each weighed for a precise measurement of the quantity. Observational studies were conducted during the second sampling period of December 7, 1990. This involved visually estimating the proportion of each waste type in a sample as accurately as possible. A description of the types of waste sampled manually and observationally follows:

1. **Manually Sampled Waste:** This includes waste from refuse collection vehicles servicing homes and businesses, and open drag-on trucks servicing commercial and industrial sources. Generally, the small and discrete materials that make up this sub-wastestream allow for manual sampling. Because this process involves exact weighing of individual components, the data accumulated is statistically more sound than data from observational sampling. Therefore, manual sampling is preferred for determining the actual percentages of individual components from this wastestream. Waste from homes and businesses, delivered by refuse collection vehicles, contributes over 80% of the total City wastestream. Analysis of the data revealed that the waste contained in this sub-wastestream is the most variable in terms of number of components and contains the greatest weights of marketable, recyclable materials.

2. **Observationally Studied Waste:** This category includes waste delivered by commercial vehicles such as tractor-trailer rigs, dump trucks and flatbed or stakebed trucks from single sources (i.e., construction sites, tree trimming jobs, and landscaping projects). Waste from these types of

vehicles constitutes nearly 20% of the City's wastestream. This waste differs greatly from the waste generated by homes and businesses, and presents opportunities for recovering significant amounts of yard waste, wood waste, and inert materials. Often the materials in this waste category are bulky and/or heavy, making manual sampling difficult. For this reason, an observational methodology is used to examine these wastes. The methodology classifies loads into one of two types, homogeneous or heterogeneous, according to distribution of the waste components.

Each of these broad divisions are further stratified by the types of vehicles delivering the wastes. A full discussion of these vehicle types can be found in Section B.

Chart A-I provides a graphic picture of the total wastestream, for the City, by sub-wastestream type. The degree of statistical sophistication used to determine the relative component percentages differed for each of the four sub-wastestreams. If the data from all sub-wastestreams were combined into one chart, the statistical significance and reliability of the data would fall to a lower level. Therefore, the total wastestream is broken down into sub-wastestreams in order to maintain the statistical integrity of the data.

2.1 Development of Sampling Design for Manually Sampled Sub-wastestream

2.1.1 Number of Samples to Collect per Truck

The optimal number of samples to collect per truck for manual sampling was determined by an optimization analysis on the variability of waste within different truck types. This analysis was performed during a waste characterization study for the County and City of San Diego (*County and City of San Diego Waste Characterization and Market Study, Technical Volume 1: Waste Characterization Study, November 1990*). The results of this analysis portrayed both how variable the waste is and how many samples are needed to capture this variability. For example, assume that three different items were found in every side loader vehicle: One-fourth of the load was newspaper. One-fourth was glass, and one-half was yard waste. The correct number of samples to collect from side loaders would be the one indicating that side loaders deliver one-fourth newspaper, one-fourth glass, and one-half yard waste. The variables in optimization equations are the waste components. Although, it's theoretically possible to perform optimization equations simultaneously for all waste components, this study was limited to separate optimization sampling analyses for cardboard, newspaper, glass, and wood. These four components were chosen as they are representative of the different size, density, and volume characteristics of the components that make up the total Manually Sampled wastestream.

As an example, Table A-1 shows the optimal number of quadrats (samples per truck) for the four selected waste components at three landfills in San Diego County: San Marcos (SM), Otay (OT), and Sycamore (SY) landfills. A quadrat is a 2' x 2' square frame used to mark a sample location. The optimal number of quadrats differed markedly between waste components. For example, glass varied between trucks more often at San Marcos than at Otay. Similarly, wood was less variable and required fewer quadrats than cardboard. Since it is impossible to sample different numbers of quadrats for different materials, Recovery Sciences, Inc. calculated the mean number of quadrats required for the four representative

CITY OF SANTA CLARA TOTAL WASTESTREAM 1990 (by Strata Type)
(LANDFILLED WASTESTREAM)

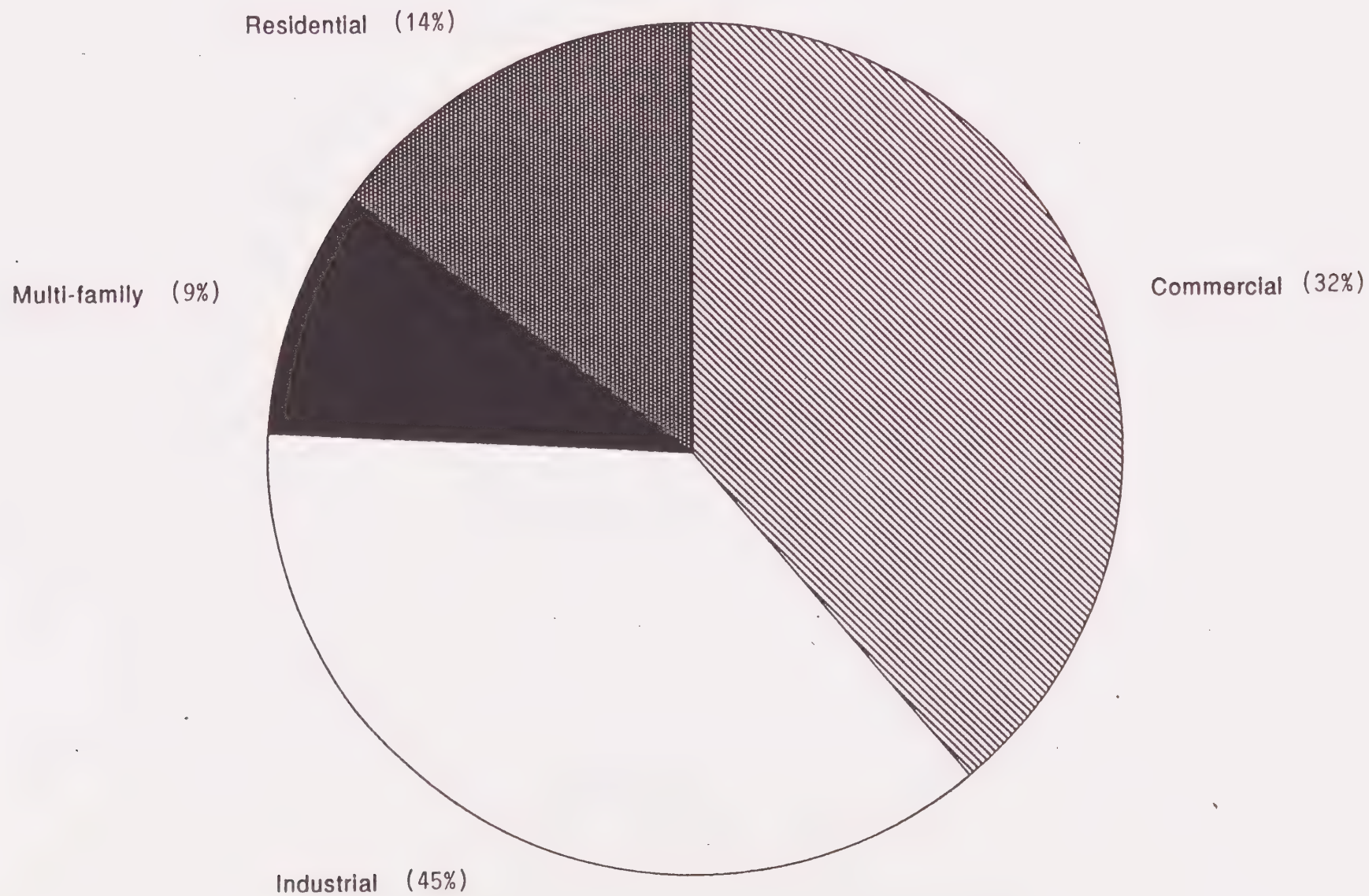


Chart A-I

materials at each landfill. Thus, one representative number of quadrats per truck was used to design the sampling program.

The results indicated that one to two quadrats per truck were necessary. Optimization results from other waste composition studies conducted by RSI have confirmed this number. Since the end of 1989, two quadrats per truck have been used. Since this slightly decreases the time needed to sample each load, it allows a greater number of trucks to be sampled over the period of the study.

Table A-1
Optimization Results -- Optimal Number of Quadrats per Truck

Waste Component	Landfill		
	SM	OT	SY
Cardboard	0.4	1.5	0.9
Newspaper	1.2	1.2	0.9
Glass	3.0	0.4	1.8
Wood	0.6	1.5	1.1
Mean	1.3	1.2	1.2

2.1.2 Number of Vehicles to Sample per Truck Type

Once the number of quadrats to collect was established, the number of trucks to sample in each category was calculated using optimization equations. The results of the optimization equations are dependent on three factors: the tonnage of waste per truck type, the variability of waste between trucks of the same type, and the maximum number of trucks that could be sampled within the scope of the project. This allows the correct proportion of truck types to be sampled. In general, the sampling is weighted in proportion to the relative tonnages delivered by each truck type.

More samples are also allotted to those waste components with higher variability between trucks. If every vehicle in a chosen truck type delivered identical waste (no variability), then the sampling results from one truck would provide an accurate description of waste for the entire category. Conversely, a greater variability of waste between trucks required more trucks to be sampled for an accurate representation of the composition. The front loader stratum is the most variable. Therefore, more front loaders are usually sampled. In addition, the open drag-on container category is generally more variable than the closed drag-on compactor group.

2.1.3 Sample Collection Procedure

Samples are collected by a **random quadrat sampling method**. Contents of chosen trucks are dumped in a rectangular pile approximately 3' high. One short side of the pile is designated as the x-axis and a long side as the y-axis. Tape measures are laid along these two

sides of the load. The x- and y-coordinates, randomly chosen before hand, designate the middle of the quadrat frames (a wooden frame measuring 2' x 2'). Sorters then manually gather a 2' x 2' x 3' volume of refuse lying within each quadrat frame and weigh it. Each sample weighs approximately 60-80 pounds. The combined weights of each sample per load are sufficient to comply with guidelines outlined in a publication by Klee & Carruth in the *Journal of the Sanitary Engineering Division, Proceedings of the American Society of Civil Engineers*, August 1970, pp. 945-954. These weighed quadrat samples are then ready for sorting into individual waste categories. Each sample is sorted using the following method:

1. Quadrat samples are sorted into 34 different categories, or as many categories as are present in the sample (See Appendix A for a description of each waste category).
2. Each category is separately weighed. The weights are recorded twice for accuracy.
3. All the categories are recombined, and the entire sample is re-weighed to ensure that all containers have been emptied.

2.2 Development of Sampling Design for Observationally Studied Sub-wastestream

RSI has developed an observational sampling protocol based on many waste characterization studies for cities and counties. Useful data can be efficiently gathered by visually estimating the proportions of different waste types in a sample when the sample comes from certain sources. The sources that best lend themselves to observational study are construction, remodeling and demolition wastes; and landscaping, tree-trimming and gardening wastes. These types of waste are often found in very homogeneous loads, and are thus easily measured by an observer's walking around the load and visually noting the contents. The data from observational studies can be used in several ways:

1. The data can be statistically processed to determine waste composition figures.
2. The data can be manually processed as back-up data for statistical results from manual sampling studies.
3. The data can be manually processed to determine waste composition figures.

For the City of Santa Clara, RSI performed extensive manual sampling of industrial and commercial waste hauled by large trash hauling companies. Therefore, the observational studies were used to determine waste composition figures for waste hauled by small or independent firms and private citizens, which were not included in the Manually Sampled portion of the study.

SECTION B DESCRIPTION OF SAMPLING STUDY

1. OVERVIEW

The 1990 City of Santa Clara sampling programs were divided into two parts: the Manually Sampled sub-wastestream and the Observationally Studied sub-wastestream. The Manually Sampled sub-wastestream studies occurred at the All Purpose Landfill from November 12 to 15, 1990. The Observational studies were done on December 7, 1990.

The purpose of the sampling efforts was to gain wastestream composition data for use in materials recovery program design. In addition, the composition data can be used to begin construction of a database for monitoring the progress of attaining the diversion goals of AB939.

1.1 Sample Collection Procedure

For the City of Santa Clara study, the stratification scheme, determination of samples per truck, and weighted sampling efforts were all based on calculation and observations made on actual 1988/89 data from the County and City of San Diego and other landfill studies.

2. DESIGN FOR MANUALLY SAMPLED SUB-WASTESTREAM

2.1 Sampling Design

2.1.1 Wastestream Stratification

RSI stratified the City's wastestream into the four sub-wastestreams (Commercial, Industrial, Multi-family, and Residential) to assist the City in designing a recovery program targeting these four waste generation sources. Refuse collection vehicles delivering the City's waste from the Manually Sampled portion of the study are described in Table B-1.

Table B-1
City of Santa Clara Manually Sampled
Sub-wastestream Truck Types

Front loaders. This stratum refers to compactor trucks that service facilities generating small-to-medium amounts of material. The trucks are equipped with steel forks which slip into the side rails of 1- to 6-cubic-yard containers. The container is hydraulically lifted over the front of the truck, and its contents are emptied into a central hopper. The material is then hydraulically compacted to maximize the amount of material that the truck can pick up.

Side/Rear loaders. This stratum refers to compactor trucks designed for residential and commercial curbside pick-ups of small amounts of material. On side loaders, often material can be loaded from either side of the vehicle into a holding area of approximately 3 cubic yards. On rear loaders, material is loaded from the rear of the vehicle only. Once the holding area is full, a blade pushes the material into the vehicle's central hopper, where it is hydraulically compacted.

Open drag-on containers. This stratum includes roll-off trucks carrying open-top containers, which also are moved on and off the truck. Because of the open top, there is no compactor function.

Closed drag-on compactors. This stratum consists of roll-off trucks carrying closed compactor drag-on containers, which are moved on and off the truck. The closed-body design of this container allows material to be compressed via a hydraulic blade.

These truck types correspond to the waste sources listed below:

Table B-2:
Sources of Waste within Truck Type

Front loaders	Apartments, offices, convenience stores, and small retail operations
Side/Rear loaders	Residential areas
Open drag-on containers	Commercial outlets, industries, manufacturers, landscaping companies, and construction companies
Closed drag-on compactors	Hotels, department stores, and high-rise office buildings

2.1.2 Number of Samples to Collect per Truck

The results of optimization tests conducted in the 1989 County and City of San Diego study indicated that two samples per truck were necessary. (See Sections A and C for a full discussion of these optimization tests.)

2.1.3 Number of Vehicles to Sample per Sub-wastestream

Once the number of samples to collect was established, the number of trucks to sample in each strata was calculated using optimization equations. (A description of the optimization process is provided in Sections A and C.) Table B-3 displays the derived figures.

Table B-3	
Number of Vehicles to Sample per Sub-wastestream	
Sub-wastestream	Number of Vehicles
Industrial	15
Commercial	8
Multi-family	4
Residential	7
Total	34

2.1.4 Vehicles Sampled

For the City of Santa Clara, 34 vehicles were sampled throughout the sampling period. Among them were 14 front loaders, 3 side loaders, 4 rear loaders, 10 open drag-on containers, and 3 closed drag-on compactors. (For information on the number of trucks sampled per truck type, please refer to Section D.)

2.1.5 Tonnage Basis for Sampling Period

The sampling period tonnages were based on tonnages from the 12 month period immediately preceding the study.

2.1.6 Sorting Categories

The materials in each sample were sorted into one of 34 categories, shown in table B-4. Appendix A contains a detailed description of each waste component.

Table B-4
Sorting Categories for Waste Components

Cardboard	Other Recyclable Glass	Manure
Newspaper	Refillable Glass Beverage	Food Waste
High Grade Paper	HDPE	Textiles
Mixed Waste Paper	LDPE	Leather
Other Paper	PET	Household Hazardous Waste
Aluminum Cans	Polypropylene	Inert Solids
Tin cans	Polystyrene	Diapers
Ferrous Metals	PVC	Tires & Rubber
Non-Ferrous Aluminum Scrap	Other Plastics	White Goods
Bi-metals	Yard Waste-Shrubby	Remainder
CA Redemption Bottle	Yard Waste-Leafy	
Other Non-Recyclable Glass	Wood Waste	

3. DESIGN FOR OBSERVATIONALLY SAMPLED SUB-WASTESTREAM

3.1 Sampling Design

3.1.1 Wastestream Stratification

The observationally sampled sub-wastestream was divided into two classifications: commercial-vehicle-hauled waste and private-citizen-hauled waste. The former originated from the four vehicle types described in Table B-5. During sampling, loads were randomly selected from each vehicle type described below.

Table B-5
Observationally Studied Waste Stratification, December 7, 1990

Stake and Flatbed trucks. This vehicle type consists of single or dual rear-axle vehicles, designed primarily for hauling bulky, lightweight materials. These vehicles may have either an hydraulic dumping capacity or a fixed bed which requires manual unloading. These vehicles generally carry brush and landscaping debris, as well as construction debris, agricultural waste, bagged refuse, and bulky waste, such as tires.

End-dump trucks and trailers. End-dump vehicles carry a variety of demolition wastes, such as heavy brush and wood, concrete, asphalt, and construction debris to dirt and other inert materials.

Trucks/Trailers/Vans. This category includes pick-up trucks, trailers, and vans used to haul commercial waste (not private-citizen-hauled waste). An example would be a contractor hauling construction debris to the landfill in a pick-up truck.

Private-Citizen Vehicles. Cars, pick-ups and vans used by private citizens (non-commercial).

RSI sampled a total of 31 of the vehicles described above, 26 of which were small commercial vehicles and 5 were private-citizen vehicles.

3.1.2 Load Classification

Each load was classified as a heterogeneous or homogeneous load. Table B-6 provides a description of this classification system.

Table B-6
Classification of Observationally Studied Waste Loads

- | |
|--|
| <p>I. Homogeneous loads (readily divertible and made up 80% by volume of a single recoverable material)</p> <p>A. Organic materials</p> <ol style="list-style-type: none">1. Wood waste2. Yard waste<ol style="list-style-type: none">a) Leaf/Grassb) Shrub/Stemc) Stump/Log <p>B. Inert materials</p> <ol style="list-style-type: none">1. Concrete2. Dirt/Rock/Sand3. Asphalt <p>C. Other Materials</p> <p>II. Heterogeneous loads (mixed materials)</p> <ol style="list-style-type: none">A. Construction/Wood/Inert/OtherB. Yard Waste/OtherC. Various Mixed Wastes |
|--|

3.1.3 Sampling Collection Procedure

A truck chosen to be observed was diverted at the landfill gate, and its contents dumped in a rectangular pile approximately 3 feet high, just as in the manual sampling procedure.

Each load was then sampled by the observation process described in Table B - 7.

Table B-7
Observationally Studied Waste Process

Step 1: Observer surveys by walking around the perimeter of the entire load, noting different components that make up the load and checking off items on the observational data sheet.

Step 2: Observer surveys by walking around the perimeter of the entire load a second time, noting relative percentage composition by volume of the bulky items or majority items in the waste.

Step 3: Observer repeats this process a third time, noting the components which make up the remainder of the load and estimating their composition to total 100%.

Step 4: As relative percentages are noted, the condition of the materials as they appear in the load is briefly described. Are they wet or contaminated? Are they readily separable? Are they unsalvageable? Are they commingled? Do they form a conglomerate?

Step 5: Any materials not listed on the data sheet are noted.

Step 6: The load is classified according to the categories in table B-4.

SECTION C: STATISTICAL METHODS FOR MANUALLY SAMPLED PORTION

This section presents information on the statistical analysis of the means representing the manually sampled portion of the study.

1. OVERVIEW

Data collected for each of the four sub-wastestreams (Commerical, Industrial, Multi-family, and Residential) during the November sampling period were examined by calculating five sets of means. Calculating the "mean is a way of finding the number that represents the central tendency (middle point) of the data recorded for each subwastestream. The following five sets of mean values were calculated:

1. Average weight proportion of each waste component for the overall wastestream
2. Average weight proportion of each waste component for the Commercial subwastestream
3. Average weight proportion of each waste component for the Industrial subwastestream
4. Average weight proportion of each waste component for the Multi-family subwastestream
5. Average weight proportion of each waste component for the Residential subwastestream

1.1 Weighting of Overall Means

The calculated means in this study represent the average weight proportion of each waste component with the following characteristics:

1.1.1 Overall Means

Overall means for the City is the weighted means of the (subwastestreams) sampled at the landfill. Each stratum mean was multiplied by the tonnage of waste measured in that subwastestream during the previous twelve months of City refuse collections.. The weighted values for the strata were summed, and the resulting total was divided by the tonnage of waste contributed by all strata for the previous twelve months. This procedure provided an overall average percentage for the landfill. Overall average tonnages were obtained by multiplying the overall average percentage by the total waste tonnage for the City.

1.1.2 Individual Strata

The weighted means of each subwastestream sampled at the landfill was multiplied by the tonnage of waste measured in that subwastestream during the previous twelve months of City refuse collections.

2. STRATIFICATION

2.1 The Advantage of Stratification

Stratification can be used as a method of increasing the precision (reduce the confidence regions) of the estimates of the mean for a region or area of interest (Cochran, 1977). When using stratification within a region, and the variability within strata is small compared to the variability between strata, the precision of the estimated mean for the region will be greater than the precision of an estimate from unstratified data. An analysis of the data in Table C-1 illustrates this principle.

Table C-1
Effect of Stratification on Precision of Estimation of the Means
(Hypothetical Data)

	Stratum A	Stratum B
	5	25
	3	23
	2	22
	1	21
	4	24
	3	23
Mean	3	23
Variance	2	2
Variance A & B		110.91

The data values could be percentages of a waste component of interest, such as recyclable newspaper. The strata could be the commercial and residential subwastestreams (strata) in a city (the region of interest). Variance A & B is the variance of the pooled data without regard to strata.

If we pool the data without regard to strata, the standard deviation of the mean for the city would be:

$$\sqrt{110.91/12} = 3.04$$

Using the strata, the standard deviation of the mean for the city would be approximately

$$\sqrt{w_a^2 s_a^2 / N_a + w_b^2 s_b^2 / N_b}$$

$$\sqrt{.25(2)/6 + .25(2)/6} = \sqrt{.167} = .41$$

(Cochran, 1977; equation 5.13, page 95), where W_A and W_B are the relative sizes of strata A and B (expressed as proportions), S_A^2 and S_B^2 are the variances in strata A and B, and N_A and N_B are the number of samples in strata A and B respectively. These computations assume that the two strata are of equal size (i.e., the total tonnages from both strata are equal), therefore W_A and W_B both equal 0.5.

2.2 The Choice of Strata

From the above example, it can be seen that the use of proper stratification can significantly reduce the variability (and increase the precision) of the estimates of the mean. Most of the variability from the pooled data comes from the differences between strata, while the variability from the stratified data only comes from within-stratum variability.

Our analyses have indicated that the Commercial and Residential sub-wastestreams differ significantly for several of the waste categories, i.e., the variability among these sub-wastestreams is greater than the variability within these sub-wastestreams. As such, stratifying the data by Commercial and Residential sub-wastestreams will increase the estimated precision of the means for the different cities or larger regions of interest. In some cases, the commercial and residential sub-wastestreams can be further subdivided to provide strata that achieve even greater precision in the mean estimates. Or, in addition to stratification by commercial and residential, different subregions with varying waste characteristics can be used as strata.

2.3 Computation of Means with Stratified Data

The mean for regions which are subdivided into strata are computed as

$$\bar{X} = \frac{\sum W_i X_i}{\sum W_i},$$

where \bar{X} is the mean of waste category X for the region, W_i is the size of stratum i, and X_i is the mean percentage of waste category X in stratum i. The summation is over all strata. \bar{X} is simply a weighted mean of the stratum percentages. It is important to use a weighted mean to avoid biasing the region mean toward the percentages in the smaller strata.

The data in Table C-1 is used to demonstrate the computations. If the total size (tonnage of all waste components for the sampling period) of stratum A were 20,000 tons, and that for stratum B were 5,000 tons, then the weighted mean for the region would be

$$\bar{X} = \frac{(20000)(3) + (5000)(23)}{20000 + 5000} = 7.$$

Note that this weighted mean is much lower than the arithmetic mean of the two strata (13). This is due to the much larger size of the stratum with the smaller mean. The weights in the weighted means do not have to be tons, but could be a measure of the relative size of the strata. However, this measure should be based on the same type of data that are used in the computation of the percentages. For example, we quantify the waste components by weight, and our measures of stratum size are likewise based on weight.

2.4 Computation of Confidence Regions of the Means with Stratified Data

The standard parametric method of computing the confidence region around the weighted means described above is discussed in Cochran (1977; Chapter 5, especially equations 5.11 and 5.13).

We have instead used a bootstrap technique to estimate the confidence regions (Efron 1982; Efron and Gong, 1983; Efron and Tibshirani, 1986; Efron, 1987). The steps in the bootstrap method for a single waste category are as follows.

- a. Data values (percentages) are randomly chosen, with replacement, from the data values for each stratum. The number of samples chosen equals the number of samples taken in the stratum.
- b. Using the randomly-chosen data values, the mean percentages of the waste category in each stratum are computed.
- c. The overall mean percentage for the region is computed as the weighted mean of the means of the individual strata (computed in b. above). In the weighted mean, each stratum is weighted by the total tonnage in that stratum (see section 2.3 above).
- d. Steps a-c are repeated many times. We usually repeat these steps 2,000 times. This will generate 2,000 separate estimates of the overall mean percentage for the region.
- e. The 95% confidence interval of the mean percentage for the region is found from the distribution of the 2,000 estimates of the overall mean. The simplest technique, called the percentile method, computes the minimum and maximum values of the 95% confidence region (for example) as the percentages representing the 2.5 and 97.5 percentiles, respectively, in the distribution of 2000 estimates. We use a method called the bias-corrected percentile method, which is similar to the percentile method, but includes a correction factor for asymmetrical distributions (Efron, 1982; Efron and Gong, 1983; Efron and Tibshirani, 1986). One can compute a confidence region for the individual strata in a similar manner by utilizing a bootstrap distribution of stratum means from the data within the stratum of interest.

We have preferred the bootstrap method rather than the parametric method to compute confidence regions because the bootstrap approach does not assume that the sample data fit any particular distribution, or that the confidence region is symmetrical around the mean. Examination of the distributions of sampled data has shown that the percentages for a waste type within a strata can be highly skewed for some waste categories.

The arcsin-square-root transformation is often applied to percentage data to remove dependence of

the variance on the mean (e.g., Klee and Carruth, 1970). In computing the confidence regions, there is no assumption that the variability within the strata is equal for all strata, making the transformation unnecessary. In addition, we have compared confidence regions and means estimated from transformed and untransformed data. The results based on the transformed data became nonsensical as the number of zero percentages in the data increased.

2.5 Allocation of Samples to the Strata

When allocating samples with a stratified design, it will be more efficient to take more samples in the larger and more variable strata. For a fixed number of samples, the variance of the overall mean will be minimized when

$$N_h = N \frac{W_h S_h}{\sum W_h S_h},$$

where N_h is the number of samples in stratum h , N is the total number of samples in all pertinent strata, W_h is the size of stratum h , and S_h is the standard deviation of the sample measurements in stratum h (Cochran, 1977, page 98). The sum is overall strata.

For example, Table C-2 contains data for contaminated film plastic from a hypothetical city in California. M_h is the number of samples taken in the respective strata.

Table C-2		
Data for Contaminated Film Plastic		
	RESIDENTIAL	COMMERCIAL
M_h	12	10
S_h	0.77654	2.07796
W_h	26436	3971
$W_h S_h$	20528.6	82528.3
$\Sigma(W_h S_h)$		103056.9
$\frac{W_h S_h}{\Sigma(W_h S_h)}$	0.19920	0.80080

Notice that the commercial stratum is larger (3971 vs. 26436 tons) and more variable (standard deviation 2.07796 vs. 0.77654) for this waste category. Thus, we would expect N_h to be larger for the commercial stratum. If we were to take more samples in hypothetical city, then we would want the relative proportions of samples in the two strata to approach .20 and .80 for the residential and commercial strata, respectively (last row of Table C-2). For example, if we were going to take 50 samples from this city (i.e., $N=50$), we would want to take $(.2)(50) = 10$ samples from the residential stratum and $(.8)(50) = 40$ from the commercial stratum.

This approach is efficient because it puts the sampling in the strata which will have the most effect on the size of the confidence region. It does not make sense to take many samples to obtain a tight confidence region in a relatively small stratum, since such strata will not contribute much to the final results, nor be very significant in future recycling efforts.

The results of such an analysis will, of course, vary for the different waste categories. The final sampling will normally be a compromise based on the results from the more important waste categories.

3. ESTIMATION OF SAMPLING EFFORT NEEDED FOR DESIRED CONFIDENCE BOUNDS

The data can be used to estimate the number of samples which may be needed to obtain confidence regions of a chosen size. This can be done with the same bootstrap method described above with small modifications of step a (Section 2.4). Normally, N random draws with replacement are taken from the data values for each stratum, where N is the number of data values in the stratum. To estimate the size of the confidence bounds when M samples are taken from a stratum, we simply take M random draws with replacement from the data values. In such analyses, the numbers of hypothetical samples (M) drawn from the different strata should reflect the principles discussed in Section 1.5.

4. DETERMINING THE OPTIMAL NUMBER OF SAMPLES PER TRUCK

4.1 The Sampling of Trucks

Rather than sample the sources of the waste materials (e.g., individual bins or cans), we feel that sampling individual trucks will usually be most efficient for estimating the percentages of materials in the strata. A single truck can contain the contents of many hundreds of bins or cans, and in effect, sampling from trucks should be representative while at the same time be less labor-intensive.

When randomly choosing the trucks for a strata, care is taken to avoid trucks which may contain waste material from more than a single strata.

4.2 Optimization Analysis

Optimization analysis is used to compute the optimal number of samples to take from each truck. The results will be optimal in that, for a set cost, the least variable estimates of mean percentages will be obtained. The optimization formula for computing the optimal number of samples to take for each truck (n) is

$$n = \sqrt{\frac{(\text{cost/truck}) (\text{variance of samples within trucks})}{(\text{cost/sample}) (\text{variance of trucks})}}$$

For example, if it costs an extra \$170 to sample each additional truck, and \$200 enumerate the waste categories in each sample within a truck, and we use standard deviation (SD) instead of the variance, this formula simplifies to

$$n = \sqrt{\frac{170}{200}} \times \frac{(SD \text{ of samples within trucks})}{(SD \text{ of trucks})}$$
$$= .92 \times \frac{(SD \text{ of samples within trucks})}{(SD \text{ of trucks})}$$

At this point, one calculates the SD values for trucks and samples within trucks from some available representative data. As an example, we used data from the residential subwastestream of Oxnard, California in August 1990, to compute the relevant standard deviations. The SD of the samples within trucks for marketable newspaper was computed as 8.9, and the SD of the marketable newspaper between trucks (SD of the truck means) was computed as 8.0. Therefore

$$n = .92 \times \frac{8.9}{8.0}$$
$$= 1.02$$

This means that to get the maximum precision (minimum confidence region) for marketable newspaper within this stratum, only one sample per truck should be taken. The number of trucks to sample would depend on available resources and the desired precision (as discussed above). We have performed similar optimization analyses with data from many regions of Southern California. The results suggest that two samples per truck will generally be optimal for the major waste categories.

See Sokal and Rohlf (1981) for additional details of the optimization method.

5. CALCULATION OF CONFIDENCE INTERVALS

The confidence intervals in this study show the range of variation a category may exhibit for 95% of all cases. The confidence intervals of the overall mean proportions were computed with the percentile bootstrap method (Efron and Tibshirani, 1986) for each waste component. This process is presented in table C-3.

Table C-3
Confidence Intervals Using the Percentile Bootstrap Method

Step 1: Trucks were randomly chosen, with replacement, from each truck type. The number of trucks chosen equaled the number of trucks actually sampled in each truck type.

Step 2: Using the randomly chosen trucks, the mean proportions for each truck type were computed.

Step 3: The overall mean proportion was computed for all strata combined in the same manner as the weighted means of the individual strata were computed in Step 2. In the weighted mean, each truck type was weighted by the total tonnage of all (pertinent) waste materials in that truck type.

Step 4: Steps 1-3 were repeated 1,000 times to generate 1,000 separate estimates of the overall mean proportion.

Step 5: The 95% confidence interval of the overall mean was computed from these 1,000 estimates. The minimum and maximum values of the confidence interval were the proportions representing the 2.5 and 97.5 percentiles, respectively, of all 1,000 estimates.

SECTION D: RESULTS

1. OVERVIEW

The following section contains the results for the Manually Sampled and the Observationally Studied portions of the City of Santa Clara wastestream. Within the Manually Sampled sub-wastestream, the total City tonnage was categorized into four sub-wastestreams. Table D-1 gives the tonnages for the previous 12 months of City refuse collection. These figures were used to derive the four sub-wastestream types. They are: 45.2% from the Industrial Sub-wastestream; 32.1% from the Commercial Sub-wastestream; 9.0% from the Multi-family Sub-wastestream; and 13.7% from the Residential Sub-wastestream. Chart D-1 shows the relative percentages that each sub-wastestream contributes to the total wastestream entering the landfills used by the City of Santa Clara.

The purpose of each sampling was to gain composition information about a specific sub-wastestream in order to design programs that recycle materials, extend landfill life and conserve natural resources. In addition, composition data will establish a baseline upon which to document and monitor the progress toward recovery goals outlined in AB 939.

Table D-1
Strata Tons and Percentages for the City of Santa Clara *

Stratum	Tons	Percent
Multi-family	23,309	9.0%
Residential	35,479	13.7%
Commercial	83,234	32.1%
Industrial	117,277	45.2%

* Landfilled wastestream

1.1 Overall Results

Table D-2 shows the weighted means and 95% confidence intervals for each material in the overall wastestream. Materials with paper fiber (including Cardboard, Newspaper, High Grade Paper, Mixed Waste Paper, and Other Paper) is the single largest category in the overall wastestream, accounting for 44.1% by weight of the samples taken. Cardboard is the largest percentage of this total (20.4%), followed by Mixed Waste Paper (8.6%), Other Paper (6.8%), Newspaper (5.6%), and High Grade Paper (2.7%). Materials with higher than expected means are Cardboard, High Grade Paper, and Tires & Rubber (2.1%). This is probably the result of the

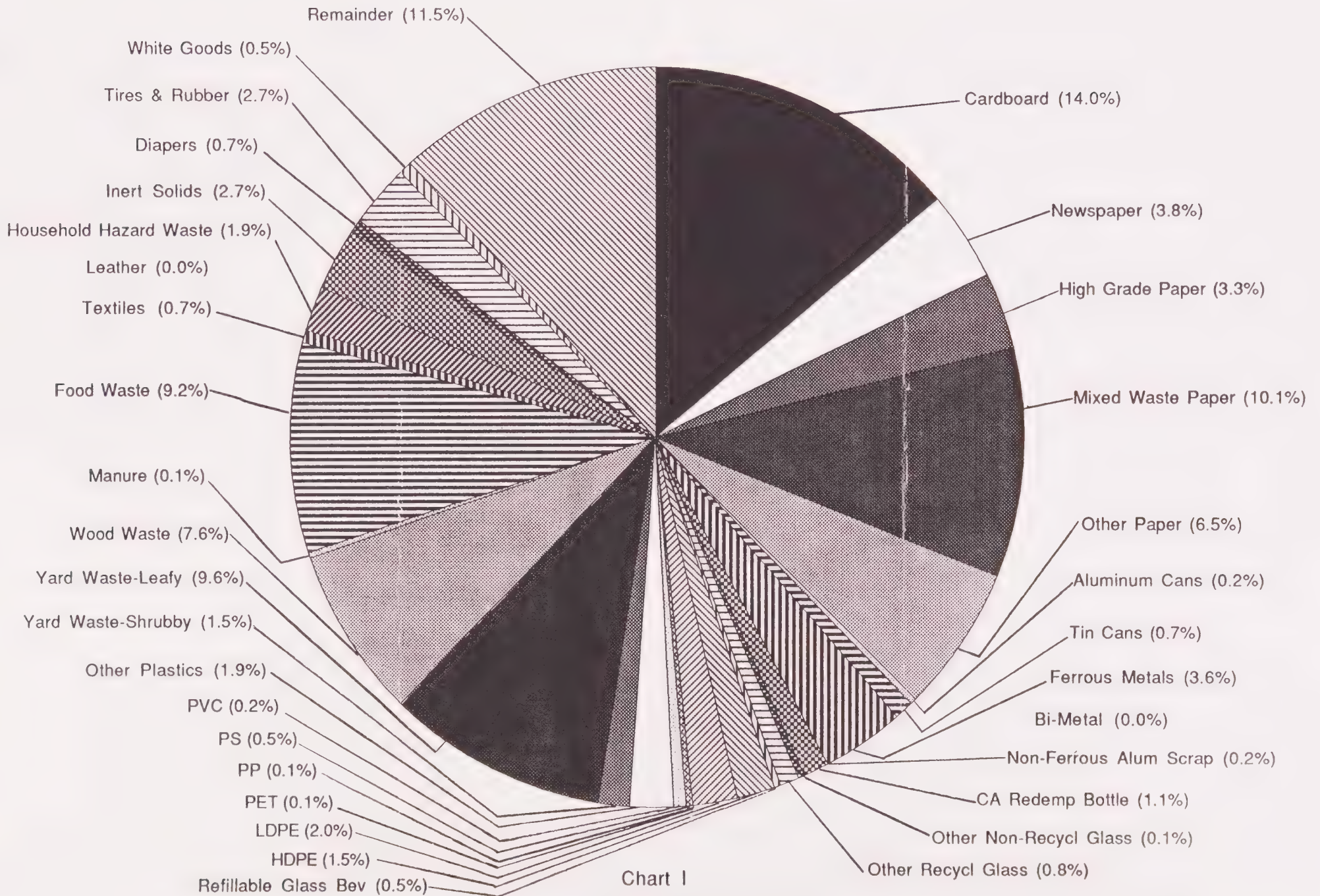
large number of manufacturing and high-technology firms in Santa Clara, which discard large quantities of packaging material, office paper and clean room supplies (latex rubber gloves). Materials with lower than expected means are Diapers (0.5%), Yard Waste (8.5%), and Wood Waste (5.6%).

Table D-2
Overall Means and Confidence Limits for the
City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	14.0	9.7	19.2
Newspaper	3.8	2.8	4.9
High Grade Paper	3.3	1.4	6.7
Mixed Waste Paper	10.1	8.0	12.4
Other Paper	6.5	5.0	7.9
Aluminum Cans	0.2	0.1	0.2
Tin Cans	0.7	0.4	1.2
Ferrous Metals	3.6	1.3	7.6
Non-Ferrous Alum Scrap	0.2	0.1	0.2
Bi-metals	0.0	0.0	0.0
CA Redemption Bottle	1.1	0.8	1.5
Other Non-Recyclable Glass	0.1	0.1	0.2
Other Recyclable Glass	0.8	0.5	1.2
Refillable Glass Beverage Containers	0.5	0.2	0.9
HDPE	1.5	0.9	2.6
LDPE	2.0	1.5	2.8
PET	0.1	0.1	0.2
Polypropylene	0.1	0.1	0.2
Polystyrene	0.5	0.4	0.7
PVC	0.1	0.1	0.3
Other Plastics	1.9	1.4	2.6
Yard Waste-Shrubby	1.5	0.6	2.7
Yard Waste-Leafy	9.6	5.8	14.3
Wood Waste	7.6	4.5	11.3
Manure	0.1	0.0	0.3
Food Waste	9.2	6.5	12.6
Textiles	0.7	0.5	1.0
Leather	0.0	0.0	0.0
Household Hazardous Waste	1.9	1.0	3.1
Inert Solids	2.7	0.8	5.8
Diapers	0.7	0.3	1.2
Tires & Rubber	2.7	1.0	5.3
White Goods	0.5	0.2	1.0
Remainder	11.5	7.1	17.3
Total	100.0*		

* Individual mean percentages may not equal 100% due to rounding

OVERALL MEANS, CITY OF SANTA CLARA, NOVEMBER 1990



1.2 Trucks Sampled

The November 1990 sampling of refuse collection vehicle waste was conducted at All Purpose Landfill on November 12, 13, 14 and 15, 1990. Table D-3 lists the 34 trucks sampled during this period. Once the relative ratios between strata were identified, trucks within each stratum were selected at random to eliminate biases in sampling. Among the 34 trucks sampled were 15 front loaders, three side loaders, four rear loaders, nine roll-offs, and three compactors. Two samples per truck were taken, for a total of 68 samples.

Table D-3
Trucks Sampled at All Purpose Landfill, City of Santa Clara, November 1990

Strata	Hauler	Truck #	Origin of Waste
November 12, 1990			
Front loader	Mission Trails	74	Commercial
Front loader	Mission Trails	71	Multi-family
Roll-off	Mission Trails	51	Industrial
Roll-off	All Purpose	59183	Industrial
Side loader	City of Santa Clara	1165	Residential
Rear loader	Mission Trails	70	Residential
Side-loader	City of Santa Clara	1397	Residential
Roll-off	Mission Trails	86	Industrial
Roll-off	Waste Management	421	Industrial
November 13, 1990			
Roll-off	Mission Trails	53	Industrial
Compactor	Waste Management	422	Industrial
Front loader	Mission Trails	74	Industrial
Front loader	Mission Trails	71	Multi-family
Front loader	Mission Trails	79	Commercial
Compactor	Browning-Ferris	292	Industrial
Compactor	Waste Management	422	Industrial
Rear loader	Mission Trails	70	Residential
Front loader	Mission Trails	78	Commercial
November 14, 1990			
Front loader	Mission Trails	78	Commercial
Front loader	Mission Trails	53	Industrial
Front loader	Mission Trails	79	Industrial
Front loader	Mission Trails	71	Multi-family
Rear loader	Mission Trails	70	Residential
Front loader	Mission Trails	74	Multi-family
Roll-off	Zanker	R2	Industrial
Roll-off	Waste Management	421	Industrial
November 15, 1990			
Roll-off	Mission Trails	85	Industrial
Front loader	Mission Trails	71	Multi-family
Front loader	Browning-Ferris	959	Commercial
Front loader	Mission Trails	74	Commercial
Roll-off	Browning-Ferris	433	Industrial
Rear loader	Mission Trails	70	Residential
Side loader	City of Santa Clara	1166	Residential
Front loader	Mission Trails	78	Commercial

2. MANUALLY SAMPLED SUB-WASTESTREAM RESULTS

2.1 Commercial Sub-Wastestream

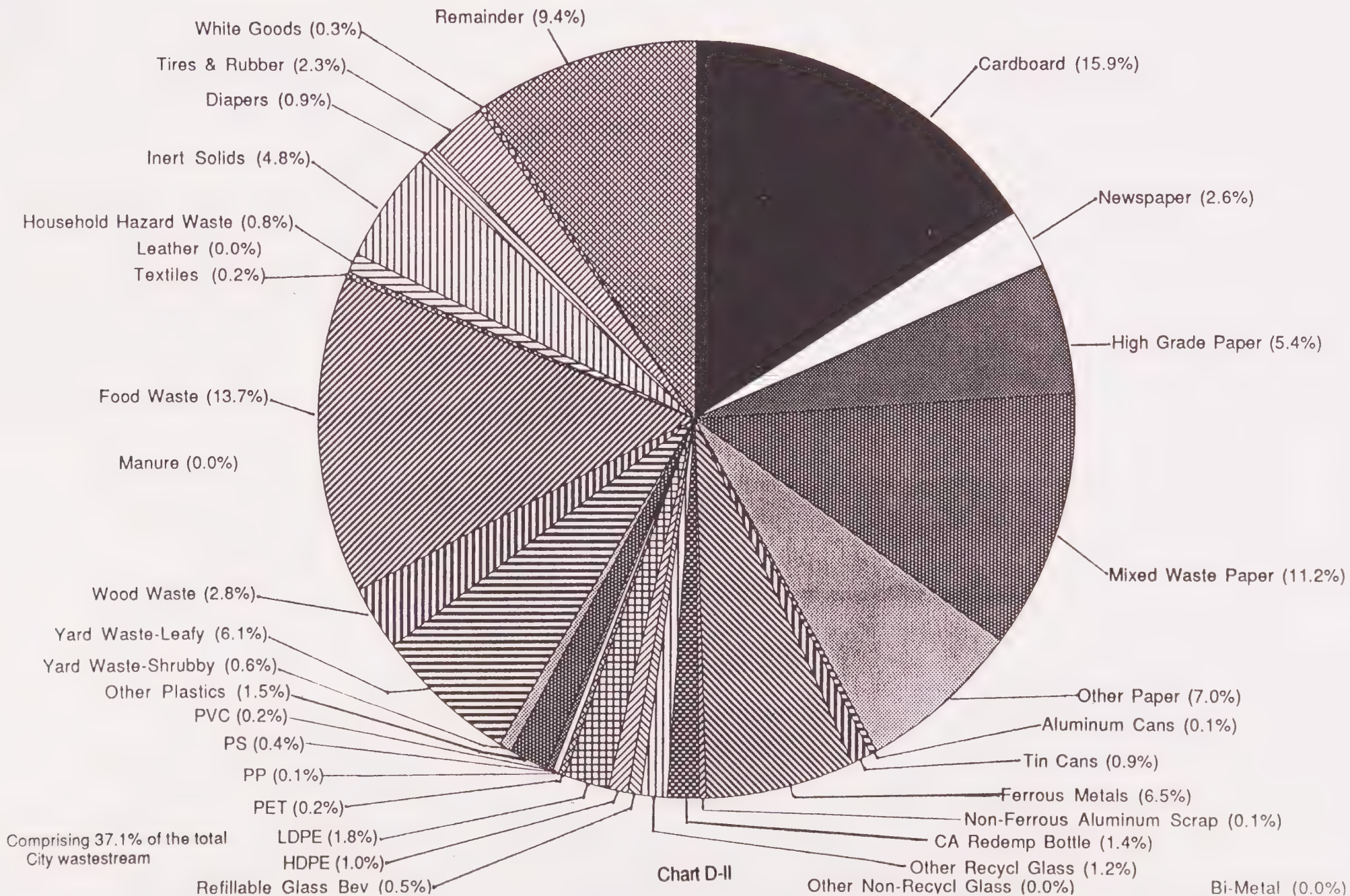
Table D-4 shows the weighted means and the 95% confidence interval for the Commercial Sub-wastestream. As expected, the major component category of paper accounts for the largest percentage by weight of the sub-wastestream at 42.1%. Materials present in particularly high amounts are Ferrous Metals (6.5%), Food Waste (13.7%), and High Grade Paper (5.4%), although they have noticeably large confidence intervals, and are less certain to be present in the amounts suggested by their means. Wood Waste is slightly lower than expected (2.8%). Newspaper is typically low (2.6%), as is Aluminum Cans (0.1%).

Table D-4
Stratum Means and Confidence Limits for the Commercial
Sub-Wastestream, City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	15.9	8.8	25.5
Newspaper	2.6	1.4	4.4
High Grade Paper	5.4	0.8	14.7
Mixed Waste Paper	11.2	7.2	15.6
Other Paper	7.0	4.5	10.2
Aluminum Cans	0.1	0.1	0.2
Tin Cans	0.9	0.2	2.5
Ferrous Metals	6.5	1.7	15.6
Non-Ferrous Aluminum Scrap	0.1	0.0	0.1
Bi-metals	0.0	0.0	0.0
CA Redemption Bottle	1.4	0.9	2.2
Other Non-Recyclable Glass	0.0	0.0	0.1
Other Recyclable Glass	1.2	0.6	2.0
Refillable Glass Beverage Containers	0.5	0.0	1.6
HDPE	1.0	0.6	1.6
LDPE	1.8	1.2	3.3
PET	0.2	0.1	0.3
Polypropylene	0.1	0.1	0.2
Polystyrene	0.4	0.3	0.6
PVC	0.2	0.1	0.4
Other Plastics	1.5	0.8	2.5
Yard Waste-Shrubby	0.6	0.0	2.8
Yard Waste-Leafy	6.1	0.8	15.3
Wood Waste	2.8	0.5	8.4
Manure	0.0	0.0	0.1
Food Waste	13.7	7.3	22.6
Textiles	0.2	0.1	0.4
Leather	0.0	0.0	0.0
Household Hazardous Waste	0.8	0.2	1.5
Inert Solids	4.8	0.3	12.3
Diapers	0.9	0.2	2.1
Tires & Rubber	2.3	0.0	9.2
White Goods	0.3	0.0	0.9
Remainder	9.4	2.6	22.5
Total	100.0*		

* Individual mean percentages may not equal 100% due to rounding

STRATUM MEANS, COMMERCIAL SUB-WASTESTREAM, CITY OF SANTA CLARA, NOVEMBER 1990 *



2.2 Industrial Sub-Wastestream

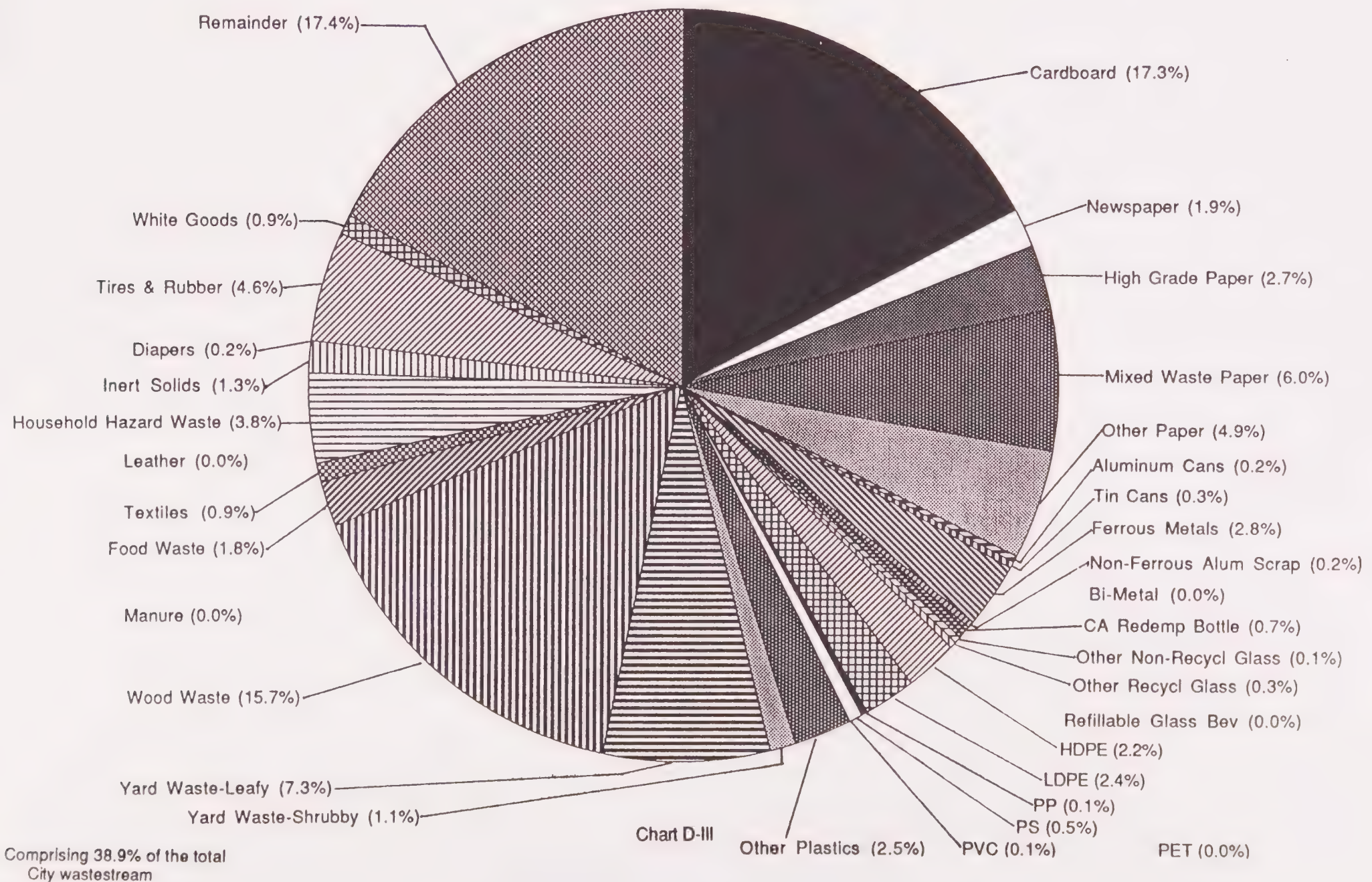
Table D-5 shows the weighted means and the 95% confidence intervals for the Industrial Sub-wastestream. Household Hazardous Waste is high, at 3.8%, due to the presence of unclean solvent containers from high-technology companies. Tires & Rubber is very high (4.7%) because of the latex gloves from clean room facilities. Wood Waste is also high for this sub-wastestream (15.7%). Typical for this sub-wastestream is a low percentage of Food Waste (1.8%), Aluminum Cans (0.2%), and Newspaper (1.9%).

Table D-5
Stratum Means and Confidence Limits for the Industrial
Sub-Wastestream, City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	17.3	9.4	27.6
Newspaper	1.9	0.7	3.7
High Grade Paper	2.7	1.1	5.0
Mixed Waste Paper	6.0	3.0	9.6
Other Paper	4.9	3.0	7.3
Aluminum Cans	0.2	0.1	0.3
Tin Cans	0.3	0.1	0.6
Ferrous Metals	2.8	0.5	8.5
Non-Ferrous Aluminum Scrap	0.2	0.1	0.4
Bi-metals	0.0	0.0	0.0
CA Redemption Bottle	0.7	0.2	1.4
Other Non-Recyclable Glass	0.1	0.0	0.3
Other Recyclable Glass	0.3	0.1	0.5
Refillable Glass Beverage Containers	0.0	0.0	0.0
HDPE	2.2	0.8	4.8
LDPE	2.4	1.2	4.0
PET	0.0	0.0	0.1
POLYPROPYLENE	0.1	0.0	0.2
POLYSTYRENE	0.5	0.3	1.0
PVC	0.1	0.0	0.2
Other Plastics	2.5	1.4	3.8
Yard Waste-Shrubby	1.1	0.0	3.3
Yard Waste-Leafy	7.3	1.5	17.2
Wood Waste	15.7	8.8	24.4
Manure	0.0	0.0	0.0
Food Waste	1.8	0.9	3.0
Textiles	0.9	0.4	1.6
Leather	0.0	0.0	0.0
Household Hazardous Waste	3.8	1.5	6.9
Inert Solids	1.3	0.2	4.4
Diapers	0.2	0.0	0.6
Tires & Rubber	4.6	1.6	8.8
White Goods	0.9	0.2	2.4
Remainder	17.4	9.3	28.4
Total	100.0*		

* Individual mean percentages may not equal 100% due to rounding

STRATUM MEANS, INDUSTRIAL SUB-WASTESTREAM, CITY OF SANTA CLARA, NOVEMBER 1990 *



2.3 Multi-family Sub-Wastestream

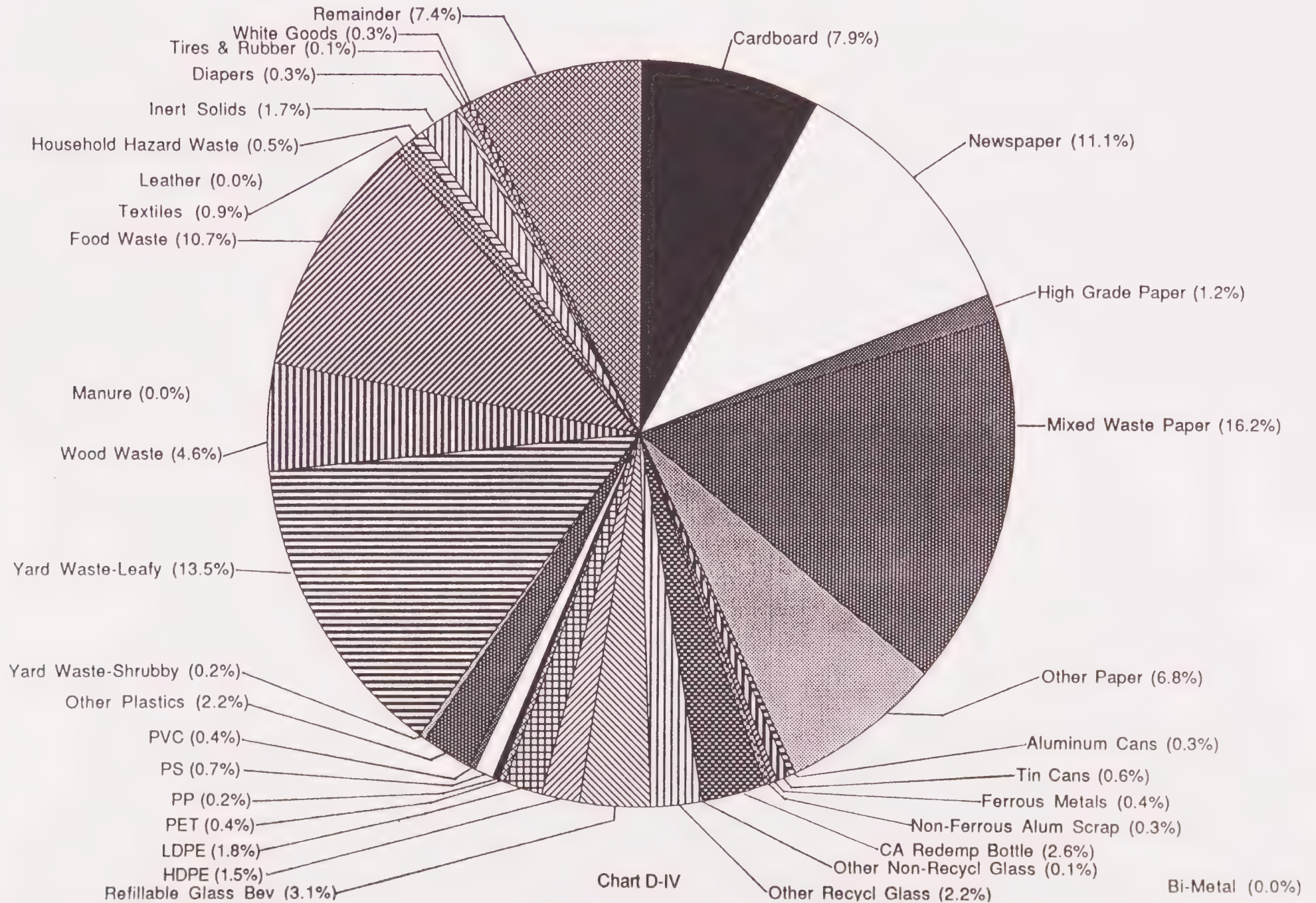
Table D-6 shows the weighted means and the 95% confidence intervals for the Multi-family Sub-wastestream. The major component category of paper is the largest category comprising 43.2%. Noteworthy are the low percentage of Diapers (0.3%) and the slightly high percentages of Food Waste (10.7%), Mixed Waste Paper (16.2%), and Newspaper (11.1%). The total percentage of Yard Waste (13.7%) is typical, and is comprised primarily of the leafy Yard Waste.

Table D-6
Stratum Means and Confidence Limits for the Multi-family
Sub-Wastestream, City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	7.9	4.2	13.1
Newspaper	11.1	6.0	16.7
High Grade Paper	1.2	0.6	2.1
Mixed Waste Paper	16.2	9.9	24.4
Other Paper	6.8	4.5	10.0
Aluminum Cans	0.3	0.1	0.4
Tin Cans	0.6	0.3	0.9
Bi-metals	0.0	0.0	0.2
Ferrous Metals	0.4	0.2	0.8
Non-Ferrous Aluminum Scrap	0.3	0.2	0.4
CA Redemption Bottle	2.6	1.3	4.2
Other Non-Recyclable Glass	0.1	0.0	0.3
Other Recyclable Glass	2.2	1.1	3.5
Refillable Glass Bev Containers	3.1	1.4	5.1
HDPE	1.5	1.0	2.0
LDPE	1.8	1.4	2.2
PET	0.4	0.1	0.7
Polypropylene	0.2	0.2	0.2
Polystyrene	0.7	0.3	1.4
PVC	0.4	0.1	1.0
Other Plastics	2.2	0.8	4.5
Yard Waste-Shrubby	0.2	0.1	0.5
Yard Waste-Leafy	13.5	4.4	25.2
Wood Waste	4.6	1.3	9.0
Manure	0.0	0.0	0.0
Food Waste	10.7	6.2	15.7
Textiles	0.9	0.5	1.3
Leather	0.0	0.0	0.1
Household Hazardous Wastes	0.5	0.8	0.9
Inert Solids	1.7	0.4	3.4
Diapers	0.3	0.0	0.6
Tires & Rubber	0.1	0.0	0.3
White Goods	0.3	0.0	1.0
Remainder	7.4	4.3	11.1
Total	100.0*		

* Individual mean percentages may not equal 100% due to rounding.

STRATUM MEANS, MULTI-FAMILY SUB-WASTESTREAM, CITY OF SANTA CLARA, NOVEMBER 1990 *



* Comprising 9.5% of the total City wastestream

2.4 Residential Sub-Wastestream

Table D-7 shows the weighted means and the 95% confidence intervals for the Residential Sub-wastestream. The major component category of paper accounts for 36.3% of this sub-wastestream, with a typically high portion of Mixed Waste Paper (14.5%). There is also an expectedly high level of Yard Waste (28.0%). The high percentage of food waste (16.7%) found in this sub-wastestream is at the high end of the range typically found.

Table D-7
Stratum Means and Confidence Limits for the Residential
Sub-Wastestream, City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	4.4	3.4	5.8
Newspaper	7.1	4.9	9.4
High Grade Paper	1.1	0.3	3.1
Mixed Waste Paper	14.5	11.0	18.6
Other Paper	9.2	5.5	12.6
Aluminum Cans	0.2	0.1	0.4
Tin Cans	1.2	0.6	1.8
Ferrous Metals	0.4	0.1	0.9
Non-Ferrous Aluminum Scrap	0.3	0.2	0.4
Bi-metals	0.0	0.0	0.0
CA Redemption Bottle	0.4	0.1	0.8
Other Non-Recyclable Glass	0.5	0.1	1.0
Other Recyclable Glass	0.4	0.1	0.7
Refillable Glass Bev Containers	0.0	0.0	0.0
HDPE	1.2	0.8	1.6
LDPE	1.9	1.2	2.6
PET	0.2	0.1	0.4
Polypropylene	0.1	0.1	0.1
Polystyrene	0.5	0.3	0.7
PVC	0.1	0.1	0.2
Other Plastics	1.4	1.0	2.0
Yard Waste-Shrubby	6.0	1.4	12.6
Yard Waste Leafy	22.0	11.5	33.8
Wood Waste	0.2	0.1	0.4
Manure	0.6	0.0	1.9
Food Waste	16.7	10.4	23.5
Textiles	1.3	0.9	1.8
Leather	0.0	0.0	0.0
Household Hazardous Wastes	0.6	0.3	1.2
Inert Solids	1.4	0.5	2.6
Diapers	2.0	0.6	4.0
Tires & Rubber	0.1	0.1	0.2
White Goods	0.1	0.0	0.2
Remainder	4.1	2.8	6.1
Total	100.0*		

* Individual mean percentages may not equal 100% due to rounding

STRATUM MEANS, RESIDENTIAL SUB-WASTESTREAM, CITY OF SANTA CLARA, NOVEMBER 1990 *

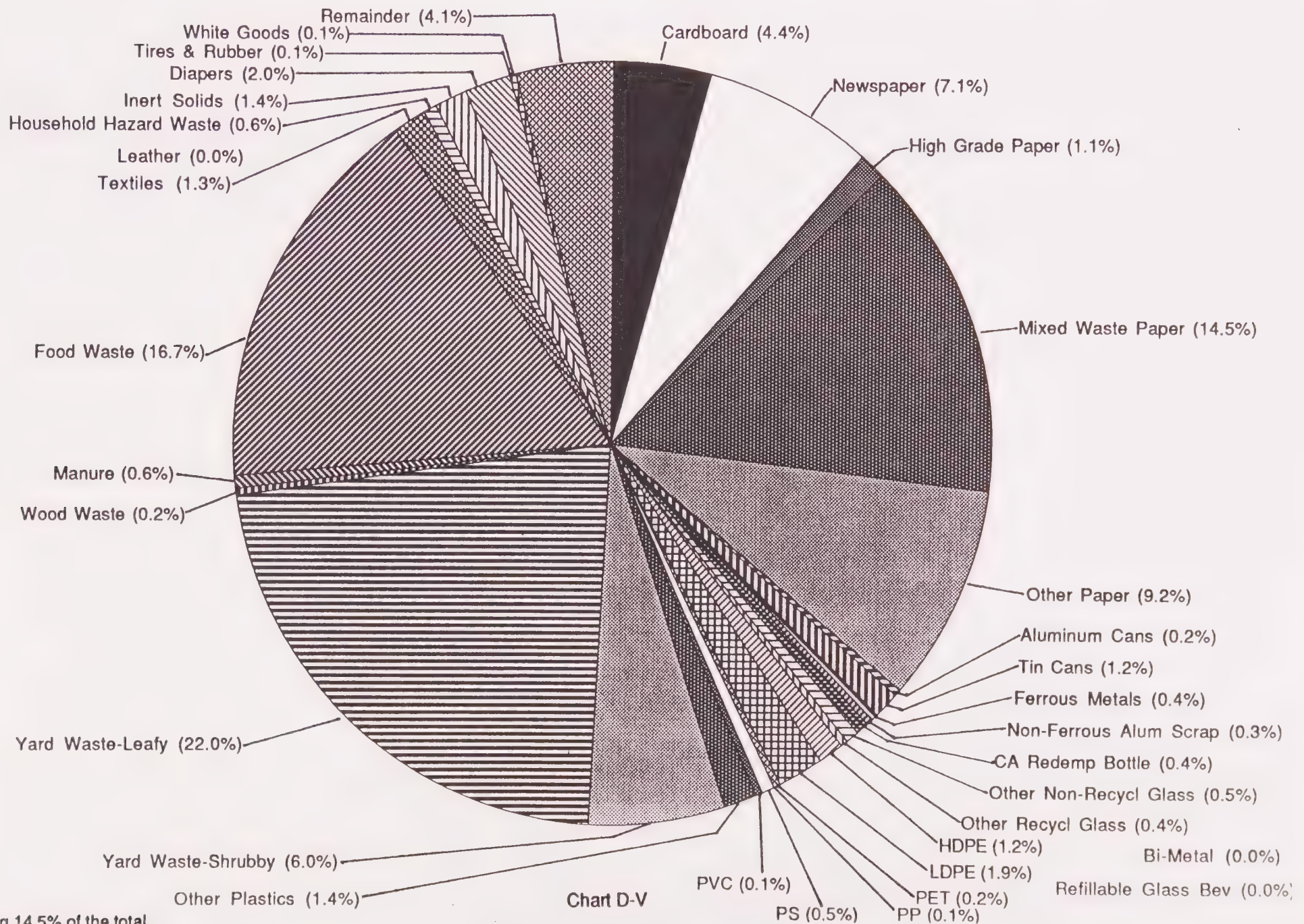


Chart D-V

* Comprising 14.5% of the total City wastestream

2.5 City Rubbish Sub-wastestream

Table D-8 shows the results for the City Rubbish Sub-wastestream. Leafy Yard Waste is by far the largest category, accounting for 41.5% by weight. Leafy and Shrubby Yard Waste together account for 54.2%. The only other significant materials are paper materials, with 17.3% Mixed Waste Paper, 8.9% newspaper, and 5.2% Cardboard. All other materials make up less than 5% of the total.

Table D-8
Stratum Means and Confidence Limits for the City Rubbish
Sub-Wastestream, City of Santa Clara, November 1990
(Percent by Weight)

WASTE CATEGORY	MEAN	LOWER CL	UPPER CL
Cardboard	5.2	3.0	7.9
Newspaper	8.9	5.0	12.4
High Grade Paper	0.3	0.2	0.4
Mixed Waste Paper	17.3	10.4	24.9
Other Paper	2.6	1.2	4.2
Aluminum Cans	0.0	0.0	0.1
Tin Cans	0.0	0.0	0.1
Ferrous Metals	0.5	0.0	1.9
Non-Ferrous Aluminum Scrap	0.1	0.0	0.4
Bi-Metals	0.0	0.0	0.1
CA Redemption Bottle	0.1	0.0	0.4
Other Non-Recyclable Glass	0.0	0.0	0.1
Other Recyclable Glass	0.0	0.0	0.1
Refillable Glass Beverage Containers	0.0	0.0	0.0
HDPE	0.4	0.1	0.7
LDPE	0.6	0.4	0.8
PET	0.0	0.0	0.0
POLYPROPYLENE	0.1	0.0	0.1
POLYSTYRENE	0.2	0.1	0.4
PVC	0.0	0.0	0.1
Other Plastics	1.0	0.3	2.0
Yard Waste-Shrubby	12.7	3.3	24.0
Yard Waste-Leafy	41.5	35.1	48.3
Wood Waste	0.3	0.0	0.9
Manure	0.0	0.0	0.0
Food Waste	3.9	0.8	8.4
Textiles	0.6	0.2	1.1
Leather	0.0	0.0	0.0
Household Hazardous Waste	0.1	0.0	0.4
Inert Solids	1.5	0.3	3.0
Diapers	0.0	0.0	0.0
Tires & Rubber	0.0	0.0	0.1
White Goods	0.2	0.0	0.5
Remainder	1.9	1.0	2.9
Total	100.0*		

STRATUM MEANS, CITY OF SANTA CLARA, NOVEMBER 1990

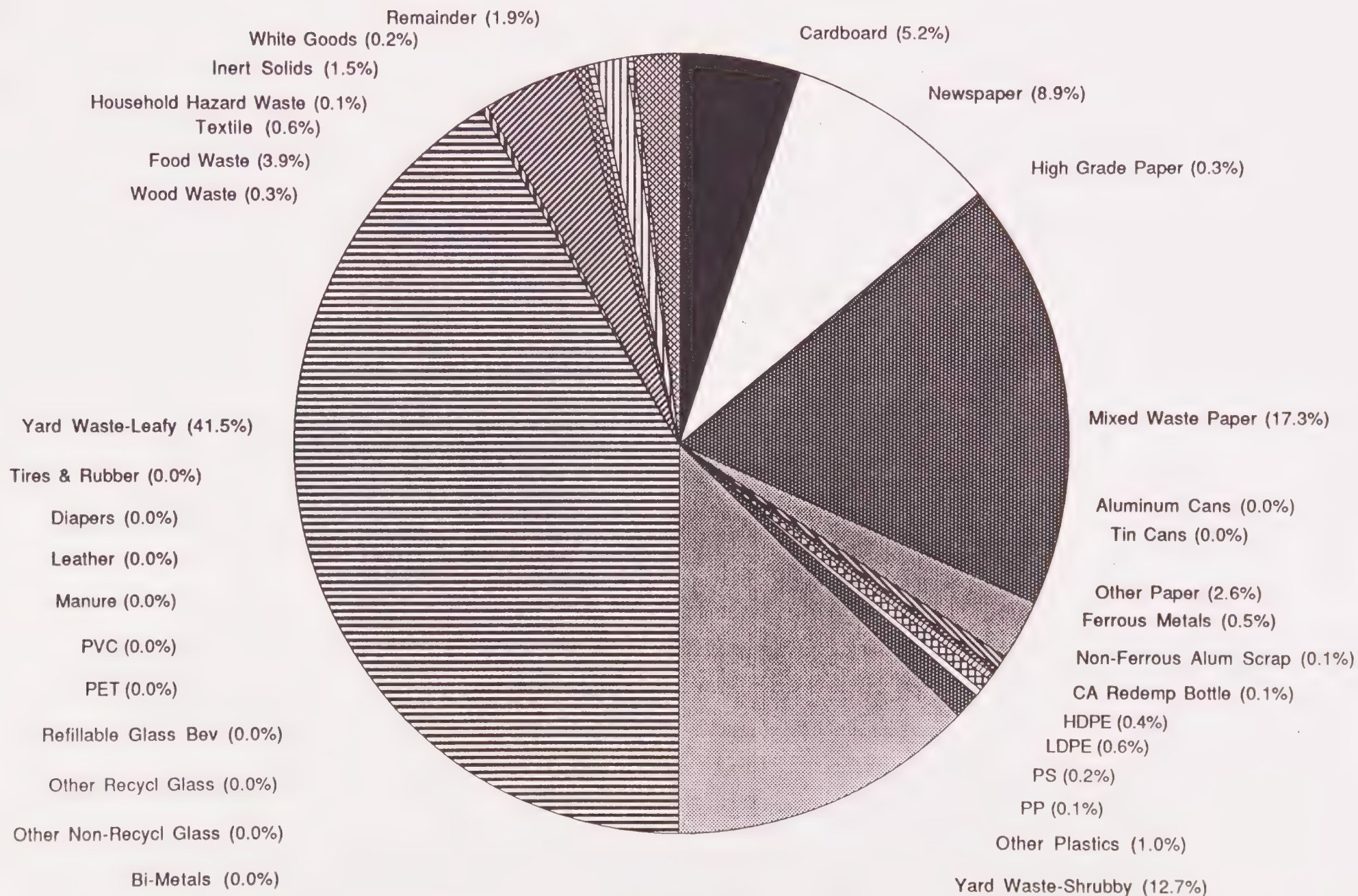


Chart D-VI

3. OBSERVATIONALLY STUDIED SUB-WASTESTREAM

The Observationally Studied vehicles included five stakebed trucks, 11 flatbed trucks, 15 pick-up trucks, one chipper truck, and one passenger car. There were 17 homogeneous loads and 14 heterogeneous loads. A complete listing of the trucks and their sources and types of wastes is presented in Table D-8.

Table D-9
Trucks Sampled at All Purpose Landfill
for the Observationally Studied Sub-Wastestream, December 7, 1990

Truck Type	Hauler	Load Number	Origin of Waste
Stakebed-15CY	McCandless Constr.	1	Construction/Demolition
Pick-up	Ind. Landscaper	2	Landscaping
Pick-up	Private Citizen	3	Home Remodeling
Pick-up	Ind. Landscaper	4	Landscaping
Pick-up	Ind. Landscaper	5	Landscaping
Pick-up	Ind. Landscaper	6	Landscaping
Stakebed-15CY	J. R. Down Constr.	7	Construction/Demolition
Pick-up (trailer)	Fence Builder	8	Construction/Demolition
Stakebed-20CY	Ind. Contractor	9	Construction/Demolition
Stakebed-30CY	Ind. Contractor	10	Construction/Demolition
Flatbed-20CY	Hansen Drywall	11	Construction/Demolition
Stakebed-20CY	Daley's Drywall	12	Construction/Demolition
Flatbed-20CY	Ind. Contractor	13	Construction/Demolition
Pick-up	Apartment Manager	14	Remodeling
Flatbed-15CY	Thermal Mechanical Heating & Cooling Co.	15	Remodeling
Pick-up	Private Citizen	16	Home Remodeling
Flatbed-20CY	Bob Kaiser Constr.	17	Construction/Demolition
Flatbed-15CY	Ind. Contractor	18	Construction/Demolition
Pick-up	Ind. Gardener	19	Landscaping
Pick-up	Ind. Contractor	20	Remodeling
Pick-up	Private Citizen	21	Home Clean-up
Pick-up	Ind. Contractor	22	Remodeling
Flatbed-20CY	Ind. Gardener	23	Landscaping
Flatbed-20CY	Brown & Sons	24	Remodeling
Pick-up (trailer)	Ind. Gardener	25	Landscaping
Chipper	Tree Trimming Service	26	Landscaping
Flatbed-15CY	Cosmos Roofing	27	Construction/Demolition
Pick-up	Ind. Gardener	28	Landscaping
Passenger Car	Private Citizen	29	Home Clean-up
Flatbed-15CY	Ind. Contractor	30	Remodeling
Pick-up	Private Citizen	31	Home Clean-up

3.1 Sampling Results

Yard Waste was the material present in the largest number of loads in the Observationally Studied Sub-wastestream, with six homogeneous and two heterogeneous loads. Most yard waste loads arrived in pick-up trucks, and were almost all very clean, containing little or no materials other than yard waste. Only a few of these loads were bagged, with one load arriving in canvas sacks which the hauler emptied for reuse.

Most stakebed and flatbed trucks contained demolition and construction waste. The material most often found in these trucks was drywall, accounting for four of the 17 homogeneous loads, and four of the heterogeneous loads. The percentage of homogeneous loads in the total sample was high, and is an indication that recovery programs involving these types of vehicles would be favorable.

Table D-9 lists the homogeneous and heterogeneous load categories as well as the number of samples occurring in each load type for the Observationally Sampled portion of the wastestream.

Table D-10
Observationally Studied Load Classifications
City of Santa Clara, December 7, 1990

Load Classification	Number of Samples
HOMOGENEOUS	
Organic Materials	
Yard Waste-Leaf/Grass	5
Yard Waste-Shrub/Stem	1
Wood	2
Inert Materials	
Dry Wall	4
Dirt	1
Construction Debris	
Roofing	2
Conglomerate Materials	
Appliances	2
Total	17
HETEROGENEOUS (Conglomerates)	
Construction/Wood/Inert/Other	9
Yard Waste/Other	2
Various mixed wastes	3
Total	14

APPENDIX

**APPENDIX A: Sorting Category Definitions for City Manually Sampled
Sub-Wastestream**

After samples were collected they were sorted into the 34 categories listed below.

CARDBOARD: Post-consumer wastepaper-grade corrugated cardboard, kraft (brown) paper bags, and solid fiber boxes.

NEWSPAPER: Newspaper which can be reclaimed and sold in the secondary materials market.

HIGH GRADE PAPER: Grades of white and colored paper, and computer print-out paper. Examples include computer forms, copy paper, and stationery.

MIXED WASTE PAPER: Clean mixture of various types and colors of paper containing less than 10% groundwood (short-fibered material).

OTHER PAPER: Waxed paper, tissue products, carbonless form paper (NCR paper), carbon paper, blueprints, lithographs, windowed envelopes and heavily contaminated paper (where the contaminant was heavier than the paper).

ALUMINUM CANS: Aluminum materials and alloys such as used beverage containers, foil, siding, and other manufactured items.

TIN CANS: Ferrous magnetic containers with a tin lining.

FERROUS METALS: Magnetic materials that can be recovered and sold as a graded type of scrap.

NON-FERROUS ALUMINUM SCRAP: Brass, bronze, alloys, and aluminum shavings and scrap.

BI-METAL CONTAINERS: Cans made with two types of metals, usually with aluminum sides and tin ends.

CA REDEMPTION BOTTLE: Glass beverage containers with the imprint "CA REDEMPTION VALUE".

OTHER NON-RECYCLABLE GLASS: Glass containers that hold pesticide or toxic products, light bulbs, fluorescent tubes and glass containing lead.

OTHER RECYCLABLE GLASS: Clear, green or amber jars, some wine bottles and glass food containers.

REFILLABLE GLASS BEVERAGE CONTAINER: Deposit glass bottles which are usually thick-walled and marked "Return for Deposit" or "Refillable." If previously refilled, they are marked with circular scratches from cleaning and re-filling equipment.

HIGH DENSITY POLYETHYLENE (HDPE): Rigid, plastic containers, usually bearing the triangular recycling symbol enclosing a "2" on the base. They can be further divided into two sub-categories: natural (without color) and colored.

Natural or uncolored HDPE consists of plastic jugs for milk, cider, distilled water, and spring water; bottles for juice (opaque), rubbing alcohol, vinegar, single-serving juice; thick grocery bags (distinguished from the thinner LDPE grocery bags using a manual tear-strength test); and base cups of soda bottles.

Colored HDPE consists of plastic bottles for laundry and dish detergent, fabric softener, saline solution, bleach, lotion, motor oil and antifreeze; dispenser for items such as dental floss and baby wipes; and thick white grocery bags.

LOW DENSITY POLYETHYLENE (LDPE): Flexible film bags for bread, produce, trash and dry cleaning. Rigid food storage containers and protecto seal coating, can be opaque or colored and from low to high gloss.

POLYETHYLENE TEREPHTHALATE (PET): Transparent and usually green or clear in color. The bottom of the containers has a small dot or nipple, and not a seam. They sometimes have a triangular recycling symbol enclosing a "1" on the base. Examples include soft drink and liquor bottles and containers for the following products: "Pepto-Bismol", "Ocean Spray" juices, "Palmolive" dish detergent, liquid "Spic & Span", and "Boil-in -the-Bag" dinners. The following products are also usually made of PET: cassette tape, pill bottles, and white or gray microwaveable trays.

POLYPROPYLENE (PP): Polypropylene can be found in hard plastic caps used on pill bottle and in flexible fast food cutlery.

POLYSTYRENE (PS) & (EPS): Brittle yogurt and cottage cheese cups and tubs, cookie and muffin trays, clear "clamshell" containers, some vitamin bottles, and most disposable cutlery.

Expanded or foamed polystyrene (EPS) is found in white "clamshell" containers, meat and produce trays, hot cups and egg cartons.

POLYVINYL CHLORIDE (PVC): Bottles used for the following products: imported mineral water, salad dressing, vegetable oil, floor polish, plastic strapping, combs, snack wraps/bags, "Tropicana" frozen juice containers, and flexible yogurt cups and lids.

OTHER PLASTICS: Other plastics include all other resin and combinations of resins. Squeezable bottles, as an example, are made by layering resins.

YARD WASTE (Shrubby): Prunings, limbs, and wood from trees and shrubs up to four inches in cross section.

YARD WASTE (Leafy): Leaves, grass, weeds, and garden debris.

WOOD WASTE: Lumber and wood products such as plywood, particle board, wood furniture, tools, and other household and industrial goods. Wood from yard waste or trees which is four inches or larger in cross section is also included.

MANURE: Animal waste from chickens, horses, pets, and farm animals.

FOOD WASTE: All institutional, retail and residential food wastes.

TEXTILES: Synthetic materials such as polyester or nylon.

LEATHER: All leather and leather products.

HOUSEHOLD HAZARDOUS WASTES: Batteries, bleach, acids, paints, thinners, oils, pesticides, and chemicals.

INERT SOLIDS: Concrete, soil, asphalt, rock, gypsum, ceramics, cookware, mirrors, and flat glass and safety glass.

DIAPERS: Soft, absorbent, disposable material designed to absorb or collect human waste.

TIRES & RUBBER: Tires, inner tubes, latex gloves and any elastic or hard rubber.

WHITE GOODS: Household appliances such as refrigerators, stoves and salvageable items such as electronic equipment, machinery, and computer components.

REMAINDER: Those materials not contained in any of the other categories. Included are mixed fines (too small to separate into individual categories), salvageable items (recoverable for reuse in their original form) and composite materials (items with more than one material component).

CHAPTER II-C SOLID WASTE DIVERSION CHARACTERIZATION

OBJECTIVE OF THE STUDY

In accordance with Title 14, Chapter 9 of the CCR, the objective of the waste diversion characterization is to determine the quantity and types of materials that are currently being diverted from permitted solid waste disposal facilities. The diversion quantities reflect the amount of materials that are generated in the City of Santa Clara and diverted from the landfill via source reduction, recycling, and composting. By State law, only those materials normally disposed of at permitted solid waste landfills, representing at least 0.001 percent of the wastestream, count towards diversion. It is essential to document the existing level of waste reduction in order to determine what type of programs need to be implemented to reach state mandated diversion rates of 25 percent by 1995 and 50 percent by 2000.

A. WASTE DIVERSION FLOW PROCESS

The flow of materials diverted from the wastestream is more complex than that for materials destined for disposal at a landfill. This complexity occurs because the various materials must be separated and processed (contaminants removed, material baled) to meet market specifications, and this is often done in facilities dedicated to one type of material. In this process, several processors may be involved between the generator and the end user. For some items, materials are taken directly to the processor from the generator, who remanufactures these materials into recycled products.

Much of the recycling in the City of Santa Clara follows a similar path, flowing from the generator to a collector, who may sell the material to a dealer. In turn, the dealer processes the material before it is ultimately sold to an end user; in some cases the dealer also acts as a collector.

B. METHODOLOGY

The solid waste diversion characterization used a multi-prong approach to document the quantity and types of materials that are diverted from disposal in the City in 1990. Waste diversion data were obtained by the following mechanisms: (1) a mail survey of collectors and processors of recyclable materials, utilizing a material flow methodology; (2) a survey of City residential and nonresidential diversion programs; (3) and (3) telephone and fax communications to clarify and supplement, whenever possible, incomplete data collected through the mail survey, as well as to obtain data from additional sources.

1. Survey of Recyclers

In order to document the quantity and types of materials that were diverted from disposal in the City in 1990, a survey was conducted of recyclers in the area. The mailing list was developed from the following sources:

- San Jose State Center for the Development of Recycling
- Santa Clara Valley Manufacturing Group's "Commercial Recycling Guide"
- Sierra Club's "Where to Recycle in Santa Clara County"
- City of Santa Clara's list of recyclers
- Telephone books

Survey forms were mailed to recyclers to determine quantities of waste diverted by material type in 1990. To promote participation in the survey, recyclers were informed that the information that they provided would be reported in aggregate form only, to ensure confidentiality. Information requested as part of the survey included:

- Business type (e.g., broker, collector, scrap metal dealer, buy-back center, etc.)
- Anticipated percentage increase (or decrease) in recycling tonnage in 1991
- Tonnage of materials collected by type for 1990
- Source of the waste (i.e., residents, commercial businesses, industry, other)
- Purchaser of recyclables (if not end user)

A copy of the survey form is presented in Appendix II-A. In a number of cases it was necessary to follow up the mailed survey with phone calls to obtain the requested data.

2. Review of City Programs

Records from collection programs in the City of Santa Clara were reviewed to obtain data on the quantities of wastes diverted from the residential wastestream (and a portion of the commercial wastestream.) Appendix II-B presents a copy of the survey form used to obtain data on these programs.

Residential diversion programs in the City of Santa Clara include the following:

- Curbside collection program
- Drop-off recycling centers
- Buy-back centers
- 20/20 centers

Commercial-industrial sector diversion programs in the City of Santa Clara consist of privately contracted collection of recyclables by privately owned recycling firms.

3. Survey of Landfill Recycling Programs

The City surveyed landfill operators by phone to obtain estimates of waste quantities diverted from landfilling. The following facilities were surveyed:

- All Purpose Landfill
- Guadalupe Landfill
- Newby Island Landfill
- Zanker Road Landfill

The following waste types generated in the City of Santa Clara were salvaged and recycled at these landfills in 1990:

- Glass, including CA Redemption Value, refillable beverage containers, and other recyclable glass
- Yard waste
- Metals, including aluminum, ferrous, and non-ferrous metals
- Plastics, including HDPE, PET, film, and other plastics
- Wood waste
- Inert solids, including concrete and asphalt

4. Cross Checking

To avoid double counting, the material flow was charted for each waste type. Data obtained from collectors that reported purchasers for a waste type were eliminated from tabulation when those purchasers also reported data for that waste type. This approach allowed material to be counted only once and quantities to be determined with the best available data.

5. Data Reduction

Waste diversion data collected were tallied on a spreadsheet form; survey results for recyclers were reported in the aggregate, in compliance with the confidentiality agreement between the consultant conducting the study and the survey respondents. The following data were tallied:

- waste generator, i.e., residential or commercial/industrial
- program type, such as curbside, drop-off, buy-back, or other
- quantitative estimates of materials diverted. Recyclers serving several jurisdictions were requested to provide data specific to the City of Santa Clara.

6. Conversion Factors and Methodology

Survey data reported as volumes were converted to weight using conversion factors from The National Recycling Coalition Measurement Standards and Reporting Guidelines, October 31, 1989, as shown in Appendix II-C. Source reduction data for diapers was calculated using a conversion factor from a document entitled Diapers in the Waste stream¹. Based on this study, it is estimated that there are 4,500 single-use diapers per ton of garbage. A value of 0.44 pounds per diaper was used as the conversion factor.

Landfill operators and recyclers also reported the following average weights of specific materials:

battery	44 lbs
mattress	40 lbs
laser toner cartridge	4 lbs. (empty)

Appendix II-D presents the methodology for solid waste diversion characterization for the County of Santa Clara (and the City of Santa Clara) used in the EMCON study (May 1991).

¹

Lehrburger, Carl, Diapers in the Waste Stream: A Review of Waste Management and Public Policy Issues, December 1988.

C. SURVEY RESPONSE RATE

A total of 138 recyclers, brokers, collectors, end users, and operators of transfer stations and landfills were surveyed as part of the City's waste diversion characterization. Of these, 49 responded, for a response rate of 36 percent. A breakdown of the responses by category is as follows:

- 130 recyclers, brokers, collectors and end users were surveyed; 41 replied, for a response rate of 32 percent
- 8 operators of landfills and transfer stations were surveyed and all responded, for a response rate of 100 percent.

The responses to the diversion survey reflect a comprehensive reporting of solid waste transfer station and disposal facility diversion programs. Brokers and collectors, however, are "under-reported" because of the unwillingness of some members of the recycling sector to divulge information they consider proprietary. Specifically, metals and some paper grades are under-reported in the results because of the noncooperation of brokers and collectors in providing information on diversion of these waste materials.

In 1990, the City conducted an extensive commercial recycling survey. The City sent a questionnaire to 1,813 businesses operating in Santa Clara requesting information on company recycling efforts. Companies with 100 or more employees that did not respond to the survey were contacted by phone. Companies with large recycling estimates were contacted to ensure that they did not include recycling tonnages for company locations outside the City. The 356 companies that responded (20 percent) recycled a total of 14,604 tons of material in 1990. A copy of the survey form and a summary of responses are shown in Appendix II-E.

Since specific data was unavailable from the countywide survey, it is not clear if some diverted materials were being double-counted between the two different surveys. Because of the low response rate for both surveys, it could be assumed that complete responses would yield totals equal to or greater than these amounts. Data available from both surveys were utilized to provide the diversion amounts presented, and double-counting was avoided as best as could be done given the situation.

D. SURVEY RESULTS

1. Contributing Programs

In the City of Santa Clara, data from the following recycling programs contributed to the waste diversion study:

- Six California redemption centers
- A single-family curbside collection program for recyclables
- Six drop-off centers
- A City complex office paper collection program
- Private business recycling programs
- Private collectors diverting paper, plastic, glass, metals, and organic material.
- Materials recovery facilities
- Landfill salvaging

2. Summary of Diversion Data

Based on the results of the surveys, the City of Santa Clara diverts an approximate 14 percent of its total solid wastestream. Given the sample size and the lack of cooperation of some brokers and collectors, the City of Santa Clara did not extrapolate from the diversion survey data. Consequently the actual diversion rate for commercial and residential recycling in the City is expected to be significantly higher than the percentage measured through this study. During the short-term planning period, the City will be implementing monitoring programs that will enable the City to present a more refined estimate of diversion activity when a Plan Revision (of the SRRE) is submitted to the Board in 1996. (See other chapters of the SRRE for details on the planned monitoring programs).

The results of the diversion characterization are presented in Table II-C.2 for the residential wastestream, and Table II-C.3 for the commercial/industrial wastestream. The quantities listed in the tables are estimates in annual tons for 1990.

3. Caveats Concerning Data

The following should be noted in reviewing the data presented in Tables II-C.1, II-C.2, and II-C.3:

- Where necessary, the data were apportioned based upon the population ratio of those areas for which the data were reported.²
- Data for industrial wastes are included in the table with commercial waste data (except where specifically listed) because collectors do not distinguish by source in their records.
- Apartment recycling is generally not reported separately from residential recycling. However, because of the different type of collection system, a column is provided for separate reporting. One advantage of keeping separate accounting for this material is that a separate public education program is often designed for apartment dwellers, and this accounting would enable tracking of the success of such a program.
- The data for landfill salvaging were placed in the commercial table. The suppliers of the data were not able to separate it out by source because of the nature of the operation.
- Data on glass tonnages from some cities were reported as commingled. According to the Department of Conservation (DOC), as of March 1, commingled glass coming from curbside programs is assumed to contain 60 percent California redemption value glass, whereas commingled glass from a certified redemption center is assumed to contain 75 percent. This percentage is based on a recent survey for DOC and thus used for this study.
- The results for tires show quantities recycled and transformed. Some tires are sent to Mexico to be recapped. Of the quantity of tires sent to transformation, 25 percent are recovered as casings and used tires before being transformed into electricity. Of the 75 percent transformed, 25 percent is recovered as by-products: gypsum, zinc, and steel. Thus, the data reported were apportioned in this manner.
- Wood waste recycling reported in the 1990 commercial survey was attributed to wood pallet recycling and reuse. No transformation quantities were included.

²

Source of the population data was ABAG (Projections '90).

E. BREAKDOWN OF DATA BY PROGRAM

1. Source Reduction

The diaper service operating in the City of Santa Clara reported serving households with approximately 261 children in diapers. The diaper company estimated an average weekly diaper use of 50 per baby, for a total of 13,050 diapers per week. Thus, a total of 149.6 tons of municipal refuse were diverted in the City in 1990 through the use of reusable cotton diapers.

2. Residential Recycling

Based on the survey of recyclers and on the City's recycling programs, an estimated 3,878 tons of wastes are diverted in the City of Santa Clara through residential recycling programs. These programs include residential curbside recycling, 3,204 tons, drop-off center recycling, 210 tons, and AB 20/20 (California redemption) programs, 465 tons, for a total of 3,878 tons. The estimated amounts by material type are listed separately in Table II-C.2 for the residential curbside and landfill drop-off programs.

3. Commercial/Industrial Recycling

The estimated quantity of solid wastes diverted by commercial/industrial business recycling in 1990 was 15,218 tons. The City offices' recycling program recycled 85 tons in 1990. Landfill salvaging recycled 19,238 tons in 1990.

F. CALCULATION OF DIVERSION RATE

Diversion by waste type for the City of Santa Clara is presented in Tables II-C.2 and II-C.3 as percent diversion; this rate was calculated by:

- tabulating the tons/year disposed by waste type and waste generator (residential, commercial, etc.)
- tallying these quantities by waste type
- in a separate column, summing the quantity of waste diverted for each waste type
- adding up the quantities disposed and diverted to determine the total quantity in tons/year generated by waste type (disposed + diverted = total generated)
- dividing the quantity source reduced, recycled, and composted by the total generated to determine the diversion rate $[(\text{source reduction} + \text{recycling} + \text{composting} \times 100) / \text{total generated} = \text{diversion rate percent}]$

G. MATERIALS TARGETED FOR DIVERSION

The following categories of materials are targeted for diversion through programs identified in the source reduction, recycling, composting, and special waste components of the SRRE. Only those materials that can be counted towards the AB 939 diversion targets are shown:

Paper:

- corrugated containers
- mixed paper
- newspaper
- high-grade ledger paper

Metals:

- aluminum cans
- other ferrous
- non-ferrous, incl. alum. scrap
- bi-metal containers
- white goods
- steel food and bev. cans

Plastics:

- polystyrene
- PET containers
- HDPE containers

Other organics:

- yard waste
- tires/rubber
- wood wastes
- textiles/leather

Glass:

- CA Redemption Value
- other recyclable glass
- refillable beverage containers

Other wastes:

- inert solids (e.g., asphalt, concrete, and soil)

H. MATERIALS TARGETED FOR DISPOSAL

The following list identifies the materials that are currently being disposed of in the City of Santa Clara that will not be diverted from disposal by the programs identified in this SRRE. The programs identified in the SRRE do not target the following list of materials because (1) the materials are non-recyclable, (2) the quantity being disposed of is insignificant, or (3) there is no market (existing or future). Only those materials that qualify as solid waste under AB 939 are shown.

Paper:

- other paper

Glass:

- other non-recyclable glass

Plastics:

- film plastics
- other plastics

Other organics:

- food waste

Table II-C.1
Quantities and Percentages of Wastes
Diverted from the City of Santa Clara's Wastestream

Waste Source	Quantities Generated (tons/year, 1990)	Quantities Diverted (tons/year, 1990)	Percent Diversion
Residential	62,965	4,177	6.6%
Commercial/Industrial	215,814	34,541	16.0%
Total	278,779	38,718	13.9%

Table II-C.2
RESIDENTIAL DIVERSION QUANTITIES (Tons, 1990)

	SOURCE REDUCTION	CURBSIDE (b)	APARTMENT RECYCLING	DROP-OFF (a)	BUY-BACK	20/20 CENTERS	COMPOSTING	TOTAL
PAPER	1.0	2,108.0	0.0	196.6	0.0	0.0	0.0	2,305.6
corrugated containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
newspaper	0.0	2,108.0	0.0	196.6	0.0	0.0	0.0	2,304.6
high grade ledger paper	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
mixed paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PLASTICS	0.0	19.0	0.0	1.0	1.6	4.0	0.0	25.6
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	19.0	0.0	1.0	1.6	4.0	0.0	25.6
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS	0.0	886.2	0.0	11.0	8.0	240.0	0.0	1,145.2
refillable bev. containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CA Redemption Value (d)	0.0	531.6	0.0	11.0	8.0	240.0	0.0	788.6
other recyclable glass	0.0	354.6	0.0	0.0	2.0	0.0	0.0	356.6
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	123.0	0.0	1.0	1.0	210.0	0.0	335.0
aluminum cans	0.0	33.0	0.0	1.0	1.0	210.0	0.0	245.0
bi-metal containers (f)	0.0	90.0	0.0	0.0	0.0	0.0	0.0	90.0
tin cans	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other aluminum	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other non-ferrous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
white goods	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
YARD WASTE (c)	148.2	68.0	0.0	0.0	0.0	0.0	0.0	216.2
OTHER ORGANICS	149.6	0.0	0.0	0.0	0.0	0.0	0.0	149.6
food waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tires/rubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
wood wastes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
agricultural crop residues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	149.6	0.0	0.0	0.0	0.0	0.0	0.0	149.6
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inert solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
batteries (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oil (a) (e)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other HHW's	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies (g)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other special waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	298.8	3,204.2	0.0	209.6	10.6	454.0	0.0	4,177.2

(a) Considered household hazardous wastes (HHW).

(b) Multi-family curbside program diversion 0.00 tons in 1990.

(c) Includes Christmas tree composting.

(d) Includes refillable beverage containers.

(e) HHW collection Days

(f) Includes tin cans.

(g) Diversion of auto bodies through private facilities 1,918.0 tons not included.

Table II-C.3
COMMERCIAL/INDUSTRIAL DIVERSION QUANTITIES (Tons, 1990)

	SOURCE REDUCTION	CITY COMMERCIAL	PRIVATE COMMERCIAL (b)	PRIVATE INDUSTRIAL	LANDFILL SALVAGING	COMPOSTING	TOTAL (f)
PAPER	0.0	18.0	6,620.2	0.0	583.9	0.0	7,222.1
corrugated containers	0.0	0.0	0.0	3,693.0	0.0	583.9	4,276.9
newspaper	0.0	0.0	0.0	270.0	0.0	0.0	270.0
high grade ledger paper	0.0	0.0	18.0	2,442.8	0.0	0.0	2,460.8
mixed paper	0.0	0.0	0.0	174.4	0.0	0.0	174.4
other paper	0.0	0.0	0.0	40.0	0.0	0.0	40.0
PLASTICS	0.0	0.0	71.3	0.0	2.5	0.0	73.8
HDPE containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PET containers	0.0	0.0	0.0	33.0	0.0	0.0	35.5
film plastics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other plastics	0.0	0.0	0.0	38.3	0.0	0.0	38.3
GLASS	0.0	0.0	656.8	0.0	31.1	0.0	687.9
refillable bev. containers	0.0	0.0	0.0	16.8	0.0	0.0	16.8
CA Redemption Value	0.0	0.0	0.0	480.0	0.0	0.0	511.1
other recyclable glass	0.0	0.0	0.0	160.0	0.0	0.0	160.0
other non-recyclable glass	0.0	0.0	0.0	0.0	0.0	0.0	0.0
METALS	0.0	63.0	2,760.1	0.0	421.9	0.0	3,245.0
aluminum cans	0.0	0.0	0.0	31.0	0.0	110.0	141.0
bi-metal containers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
tin cans	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other ferrous	0.0	0.0	63.0	2,518.6	0.0	311.9	2,893.5
other aluminum	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other non-ferrous	0.0	0.0	0.0	38.5	0.0	0.0	38.5
white goods	0.0	0.0	0.0	172.0	0.0	0.0	172.0
YARD WASTE	0.0	0.0	258.0	0.0	0.0	0.0	258.0
OTHER ORGANICS	0.0	0.0	4,838.6	0.0	0.0	0.0	4,838.6
food waste	0.0	0.0	0.0	20.0	0.0	0.0	20.0
tires/rubber	0.0	0.0	0.0	16.0	0.0	0.0	16.0
wood wastes (d)	0.0	0.0	0.0	4,802.6	0.0	0.0	4,802.6
agricultural crop residues (c)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
manure	0.0	0.0	0.0	0.0	0.0	0.0	0.0
textiles/leather	0.0	0.0	0.0	0.0	0.0	0.0	0.0
diapers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other misc. organics	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER WASTES	0.0	0.0	0.0	0.0	18,199.0	0.0	18,199.0
inert solids	0.0	0.0	0.0	0.0	0.0	0.0	18,199.0
batteries (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
oil (a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other HHW's	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPECIAL WASTES	0.0	3.6	13.1	0.0	0.0	0.0	16.7
ash	0.0	0.0	0.0	0.0	0.0	0.0	0.0
sewage sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
industrial sludge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
asbestos	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto shredder waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0
auto bodies	0.0	0.0	0.0	0.0	0.0	0.0	0.0
mattresses	0.0	0.0	0.0	0.0	0.0	0.0	0.0
other special waste (e)	0.0	0.0	3.6	13.1	0.0	0.0	16.7
TOTAL	0.0	64.6	15,218.1	0.0	19,238.4	0.0	34,541.1

(a) Considered household hazardous wastes (HHW).

(b) Includes industrial. EMCON data included from recyclers not mentioned in city survey.

(c) Diversion of 2,999.5 tons agricultural crop residues through private facilities. Transformation not included.

(f) No transformation quantities identified in 1990.

(d) Wood pallet recycling; no transformation included

(e) Silicon, toner cartridges, clothing, office furniture, bicycles

I. SEASONALITY

It has been assumed that four seasons could potentially impact the disposed wastes in the City of Santa Clara. This assumption is based on three years of historical quantity data for landfilled wastes.

Figure II-C.1 presents the City Residential Single-Family Rubbish Collection program monthly disposed wastes for calendar years 1989, 1990, and 1991. The waste characterization for this sub-wastestream indicates a total of 54.2 percent of the total waste disposed was yard waste (shrubby and leafy). The quantity of these disposed wastes over the three year period averaged 930 tons/month. A summary of the average quantities by seasonal three month periods is as follows:

Spring (March - May)	929 tons/month
Summer (June - August)	1,001 tons/month
Autumn (September - November)	846 tons/month
Winter (December - February)	847 tons/month

The monthly average of disposed waste quantities during the winter season was 9 percent less than the overall monthly average for the three-year period. The largest quantities of waste were disposed during the summer season; the monthly average during the summer was 8 percent greater than the overall monthly average.

Figure II-C.2 and figure II-C.3 summarized the remainder of the refuse disposal at the landfill. The first figure reflects the total excluding quantities collected through the City's rubbish program. The second figure also excludes waste collected in the clean-up campaign (April - May). The waste characterization study for the total wastestream indicated a total of 11.1 percent is due to yard wastes (shrubby and leafy). The average monthly quantity of these disposed wastes over the three year period is as follows:

<u>Description</u>	<u>Monthly Average</u>
Other Refuse (not including City Rubbish)	12,556 tons/month
Other Refuse (not including City Rubbish and Clean-Up)	11,960 tons/month

A summary of the average quantities by three month periods is as follows:

<u>Period</u>	<u>Monthly Average (tons/month)</u>	
	<u>w/o Rubbish</u>	<u>w/o Rubbish and Clean-Up</u>
Spring (March - May)	15,949	13,568
Summer (June - August)	12,356	12,356
Autumn (September - November)	10,456	10,456
Winter (December - February)	11,501	11,501

The monthly average (without rubbish and clean-up) of disposed waste quantities during the winter season was 4 percent less and autumn was 13 percent less than the overall monthly average for the three-year period. The largest quantities of waste were disposed during the spring season; the monthly average during the spring was 13 percent greater than the overall monthly average. Based on this data, it appears that the quantities of waste disposed by the City of Santa Clara demonstrate seasonal variations similar to those identified in other waste characterization studies conducted in California. It should be noted that these tonnage figures may not reflect typical quantities disposed due to the five-year drought in this area of California.

The potential seasonal impacts on the composition of the wastestream were considered based on the following factors: demographics of the area, degree of commercial development, local meteorology, general economic conditions, the results of the disposed waste characterization, historical quantity data from the hauler, and the results of seasonal waste characterization studies conducted for the City and County of San Francisco (1985/86),³ the City of Berkeley (1988/89), North Santa Clara County (NSCC) (1983/83),⁴ and San Diego County (1988/89).⁵ This information was reviewed with emphasis placed upon the prior four season waste characterization study for North Santa Clara County. Based on review and on the fact that yard waste is a significant percentage of the wastestream, yard waste is judged to be the only specific component that may undergo a substantial seasonal variation in generation. Based on the results of the NSCC study, the concentration of yard waste is expected to fluctuate within plus or minus 20 percent of the estimated annual average over the course of a year.

³ "Solid Waste Characterization Study," prepared by Cal Recovery Systems, Inc. for the City of San Francisco, 1987.

⁴ "North Santa Clara County Comprehensive Waste Characterization Study (1982-1983), Final Summary Report," by Cal Recovery Systems, Inc. for the NSCC Solid Waste Management Authority, 1984.

⁵ "Waste Characterization and Market Study," by Recovery Sciences, Inc., for the County of San Diego, 1989.

Figure II-C.1 City of Santa Clara
Rubbish Collected

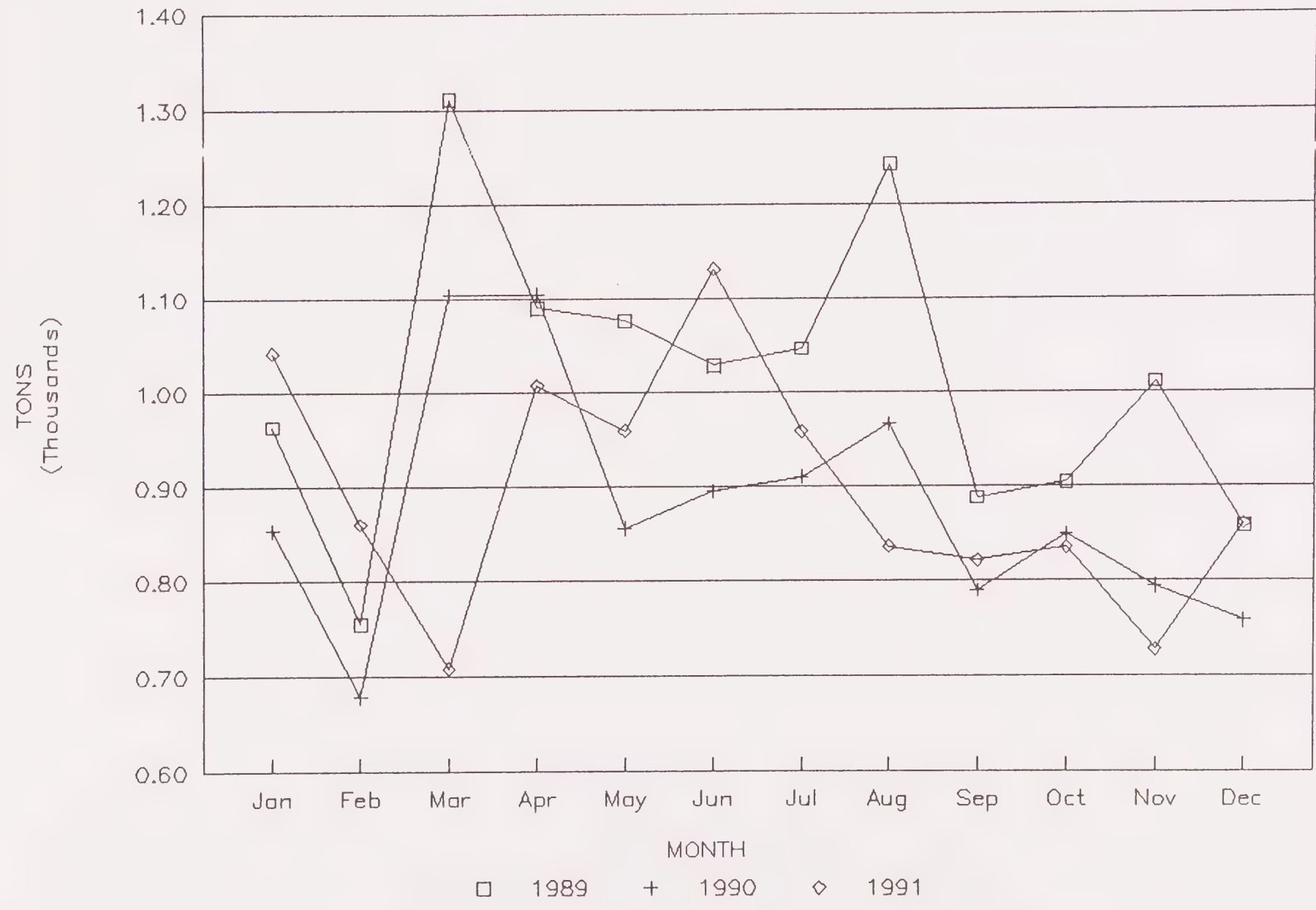
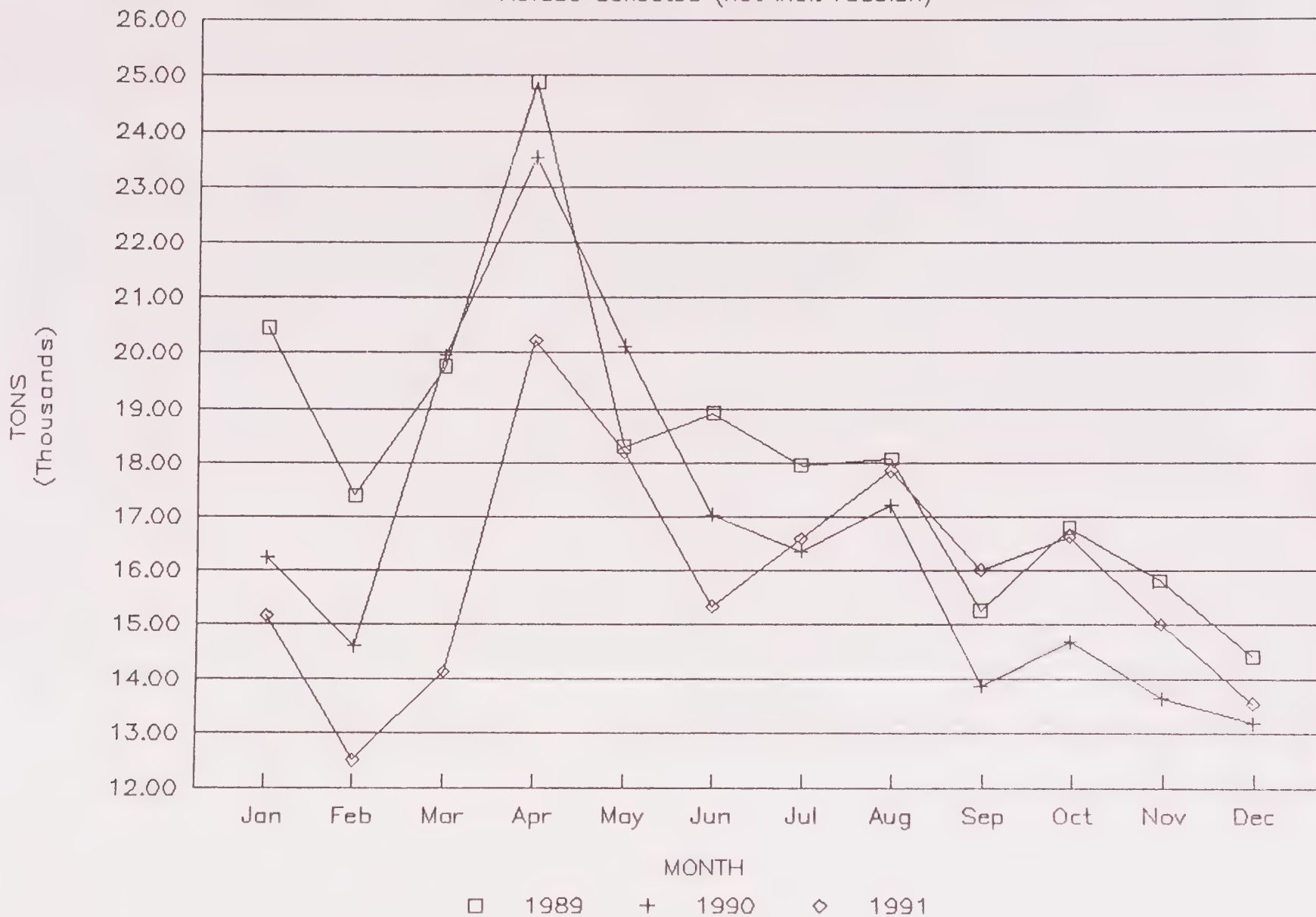


Figure II-C.2 City of Santa Clara

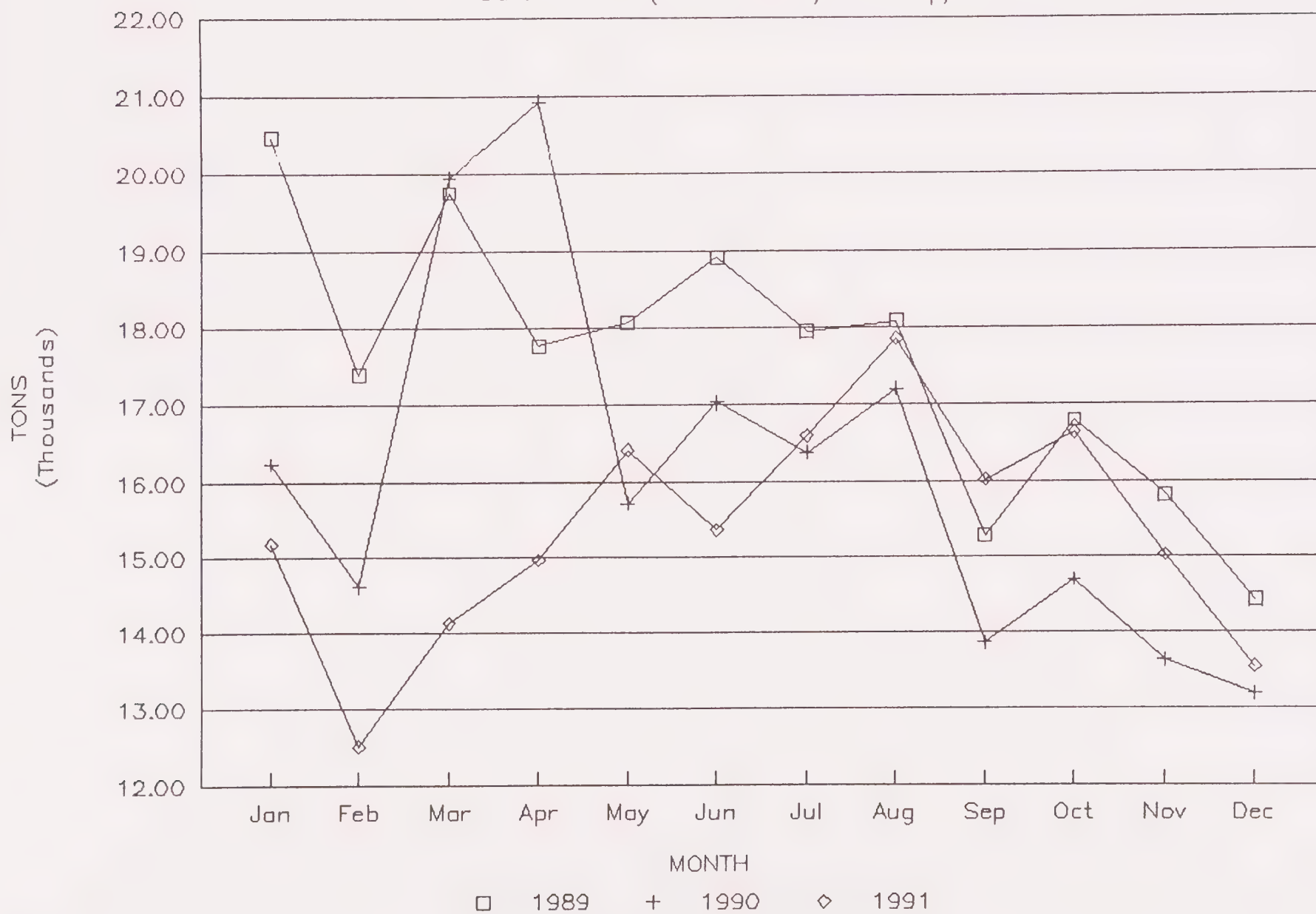
Refuse Collected (not incl. rubbish)



Note: Annual Clean-Up Campaign, Apr-May (approx. 7,000 tons refuse disposed)

Figure II-C.3 City of Santa Clara

Other Refuse (excl. rubbish/clean-up)



APPENDIX II-A
SURVEY FORM SENT TO RECYCLERS
(By EMCON As Part of the Countywide Study)



COUNTY OF SANTA CLARA RECYCLING SURVEY

to
Recycling Collectors and Brokers
operating within or receiving materials from within
the County of Santa Clara

*The information in this survey will be kept confidential and will be used to prepare a report for the
County of Santa Clara and the incorporated cities in the County to comply with the California
Integrated Waste Management Act of 1989*

COMPANY NAME: _____

ADDRESS: _____

TELEPHONE: _____

CONTACT PERSON: _____ TITLE: _____

TYPE OF BUSINESS: (Please check all that apply.)

- | | |
|--|---|
| <input type="checkbox"/> Collector/Hauler | <input type="checkbox"/> Broker |
| <input type="checkbox"/> Dealer/Packer | <input type="checkbox"/> End market/Manufacturer |
| <input type="checkbox"/> Convenience Zone Redemption Center | <input type="checkbox"/> Scrap Metal Dealer |
| <input type="checkbox"/> Buy-Back Center | <input type="checkbox"/> Auto Wrecker |
| <input type="checkbox"/> Donation Center | <input type="checkbox"/> Asphalt/Concrete Recycler |
| <input type="checkbox"/> Non-profit Organization | <input type="checkbox"/> Demolition Debris Recycler |
| <input type="checkbox"/> Commercial Composter | <input type="checkbox"/> Wood Waste Chipper |
| <input type="checkbox"/> News Bin Operator | <input type="checkbox"/> Confidential Paper Service |
| <input type="checkbox"/> Other Commercial Recycler (Specify) _____ | |
| <input type="checkbox"/> Special Waste Recycler (See listing below; specify) _____ | |

When completed, please return this survey in the enclosed postpaid envelope to:
Katherine Dever, EMCON Associates, 1921 Ringwood Avenue, San Jose, California 95131.
If you have questions regarding this survey, call Ms. Dever at 408/453-7300.

-
1. On the following page, please include the TOTAL TONS of MATERIAL COLLECTED, BY TYPE, for a recent twelve month period from an aggregate of accounts WITHIN THE COUNTY OF SANTA CLARA, by unincorporated area and city jurisdiction only, not from other sources.

Twelve month period used is from _____ to _____

- 2a. Anticipated increase in recycling tonnage for 1991: _____ % or
2b. Anticipated decrease in recycling tonnage for 1991: _____ %
3. Amount of residue: _____ % of total amount collected which is not recyclable and is discarded.

CITY _____

Please indicate SOURCE of the material (give % if more than one source) Residents, Commercial Businesses, Industry, or Other.

Materials Collected

Total Tons Received (by City)

Source

Purchaser (if not end user)

PAPER

- Corrugated cardboard
- Mixed paper
- Newspaper
- High grade ledger
- Other paper (specify)

PLASTICS

- HDPE containers
- PET containers
- Film plastics
- Laser toner cartridges
- Other plastics

GLASS

- Refillable glass beverage containers
- CA Redemption Value glass
- Other recyclable glass

METALS

- Aluminum cans
- Bi-metal containers
- Ferrous metals and tin cans
- Non-ferrous metals plus al scrap
- White goods (appliances, etc.)

YARD WASTE

- including leaves, grass and prunings

OTHER ORGANICS

- Food waste
- Tires and rubber products
- Wood waste, incl. pallets
- Agricultural crop residues
- Manure
- Textiles and leather

INERT SOLIDS

- Rock, concrete, brick
- Sand, soil, or dirt

SPECIAL WASTES

- Ash
- Industrial sludge
- Auto shredder waste
- Batteries
- Oil
- Other (specify)

**CONFIDENTIALITY AGREEMENT REGARDING
SOLID WASTE DIVERSION STUDY
BY EMCON ASSOCIATES**

WHEREAS, COUNTY OF SANTA CLARA, hereinafter "County," wishes to identify the amounts and types of waste being generated, recycled and reduced by various commercial and industrial businesses in the County of Santa Clara by conducting solid waste diversion surveys through its representative, EMCON Associates (EMCON), and

WHEREAS, the general purpose of such solid waste diversion surveys will be to determine what types and quantities of refuse and recyclables are generated or reduced by the business concerned, and whether it is economically feasible for that business to recycle the materials or reduce its waste, and

WHEREAS, _____, hereinafter referred to as "Company," has agreed to cooperate with County staff and furnish information and materials about its operations at its _____ facility(s) located at _____ to EMCON on the terms and conditions set forth below,

NOW, THEREFORE, the parties hereby agree as follows:

1. In consideration for the furnishing by Company of the opportunity to review, examine, and otherwise obtain information necessary to perform solid waste diversion surveys of Company's facility, including the right by EMCON to interview employees or representatives of the Company, EMCON agrees that all proprietary information or trade secrets

furnished to it in confidence by Company shall be used only for the purpose contemplated, and shall not be used for any other purpose or be disclosed to any third party without prior written permission of Company.

2. It is understood that EMCON shall have no obligation of confidentiality with respect to any information known by it, or generally known within the industry, prior to the date of this agreement, or which information becomes common knowledge within the industry thereafter.
3. Should any documents prepared by EMCON which contain proprietary or trade secrets information obtained pursuant to this agreement be the subject of a request for disclosure pursuant to the Public Records Act (Government Code Section 6250 et seq), EMCON shall give Company prompt notice of such request, and an opportunity to object to the production of such documents on that basis. Should the company declare its objection to such production, EMCON will defend against such production in any action brought to obtain such documents through the Public Records Act, and shall give notice and an opportunity for Company to join such action.
4. Should access to proprietary information or trade secrets obtained by EMCON through this agreement be sought by any other legal process, EMCON shall give prompt notice to Company of such demand and EMCON shall provide Company an opportunity to join in such action.
5. Any and all costs, including, but not limited to, in-house and outside attorney's fees to respond in the manner outlined in paragraphs 3 and 4 shall be reimbursed by Company.

Dated: _____ EMCON Associates

By: _____

Dated: _____ "Company"

By: _____

APPENDIX II-B
SURVEY FORM FOR CITY PROGRAMS
(By EMCON As Part of the Countywide Study)

Table 1. RESIDENTIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
PER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
ASTICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
ASS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
TALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
RD WASTE							
leaves, grass							
brush, branches							
HER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
HER WASTES							
Inert solids							
hazardous waste							
ECIAL WASTES							
ash							
sewage sludge							
Industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

**Table 2. RESIDENTIAL DESTRUCTION PROGRAMS
(Purchaser)**

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Table 3. COMMERCIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
ER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
STICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
SS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
ALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
ID WASTE							
leaves, grass							
brush, branches							
IER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
IER WASTES							
inert solids							
hazardous waste							
ECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

Table 4. COMMERCIAL DISPOSITION PROGRAMS
(Purchaser)

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

Table 5. INDUSTRIAL DIVERSION PROGRAMS
(Tons/Year)

							Total
APER							
corrugated containers							
newspaper							
high grade ledger paper							
mixed paper							
other paper							
LASTICS							
HDPE containers							
PET containers							
film plastics							
other plastics							
LASS							
refillable bev. containers							
CA Redemption Value							
other recyclable glass							
other non-recyclable glass							
ETALS							
aluminum cans							
bi-metal containers							
tin cans							
other ferrous							
other aluminum							
other non-ferrous							
white goods							
ARD WASTE							
leaves, grass							
brush, branches							
OTHER ORGANICS							
food waste							
tires/rubber							
wood wastes							
agricultural crop residues							
manure							
textiles/leather							
diapers							
other misc. organics							
OTHER WASTES							
inert solids							
hazardous waste							
SPECIAL WASTES							
ash							
sewage sludge							
industrial sludge							
asbestos							
auto shredder waste							
auto bodies							
other special waste							
TOTAL							

**Table 6. INDUSTRIAL DIVERSION PROGRAMS
(Purchaser)**

PAPER						
corrugated containers						
newspaper						
high grade ledger paper						
mixed paper						
other paper						
PLASTICS						
HDPE containers						
PET containers						
film plastics						
other plastics						
GLASS						
refillable bev. containers						
CA Redemption Value						
other recyclable glass						
other non-recyclable glass						
METALS						
aluminum cans						
bi-metal containers						
tin cans						
other ferrous						
other aluminum						
other non-ferrous						
white goods						
YARD WASTE						
leaves, grass						
brush, branches						
OTHER ORGANICS						
food waste						
tires/rubber						
wood wastes						
agricultural crop residues						
manure						
textiles/leather						
diapers						
other misc. organics						
OTHER WASTES						
inert solids						
hazardous waste						
SPECIAL WASTES						
ash						
sewage sludge						
Industrial sludge						
asbestos						
auto shredder waste						
auto bodies						
other special waste						

APPENDIX II-C
CONVERSION FACTORS
National Recycling Coalition
Densities for Recyclables

Figure 4: Sample Weight to Volume Conversion Factors for Recyclables

<u>Material</u>	<u>Volume</u>	<u>Weight in Pounds</u>
Newsprint, Loose	one cubic yard	360 - 800
Newsprint, compacted	one cubic yard	720 - 1,000
Newsprint	12" stack	35
Corrugated cardboard, loose	one cubic yard	300
Corrugated cardboard, baled	one cubic yard	1000 - 1200
Glass, whole bottles	one cubic yard	600 - 1,000
Glass, semi crushed	one cubic yard	1,000 - 1,800
Glass, crushed (mechanically)	one cubic yard	800 - 2700
Glass, whole bottles	one full grocery bag	16
Glass, uncrushed to manually broken	55 Gallon Drum	125 - 500
PET soda bottles, whole, loose	one cubic yard	30 - 40
PET soda bottles, whole, loose	gaylord	40 - 53
PET soda bottles, baled	30" x 48" x 60"	500
PET soda bottles, granulated	gaylord*	700 - 750
PET soda bottles, granulated	semi-load	30,000
Film, baled	30" x 42" x 48"	1,100
Film, baled	semi-load	44,000
HPDE (dairy only), whole, loose	one cubic yard	24
HPDE (dairy only), baled	30" x 48 x 60"	500-800
HPDE (mixed), baled	30" x 48 x 60"	600-900
HPDE (mixed), granulated	gaylord	800 - 1,000
HPDE (mixed), granulated	semi-load	42,000
Mixed PET & Dairy, whole, loose	one cubic yard	average 32
Mixed PET, Dairy and other rigid, whole, loose	one cubic yard	average 38
Mixed rigid, no film or Dairy, whole loose	one cubic yard	average 49
Mixed rigid, no film, granulated	gaylord	500 - 1,000
Mixed rigid & film, densified by mixed plastic mold technology	one cubic foot	average 60
Aluminum cans, whole	one cubic yard	50 - 74
Aluminum cans, whole	1 one full kraft paper grocery bag	average 1.5
Aluminum cans	one 55 gal plastic bag	13 - 20

* Gaylord size most commonly used 40" x 48" x 36"

Figure 4: Sample Weight to Volume
Conversion Factors for Recyclables

<u>Material</u>	<u>Volume</u>	<u>Weight in Pounds</u>
Ferrous cans, whole	one cubic yard	150
Ferrous cans, flattened	one cubic yard	850
Leaves, uncompacted ⁸	one cubic yard	250 - 500
Leaves, compacted	one cubic yard	320 - 450
Leaves, vacuumed	one cubic yard	350
Wood chips	one cubic yard	500
Grass clippings	one cubic yard	400 - 1500
Used Motor Oil	one gallon	7
Tire - Passenger Car	one	12
Tire - Truck	one	60
Food Waste, solid and liquid fats	55 gallon drum	412

VI. Conclusion

"Standard" is defined as "something considered by an authority or by general consent as a basis of comparison; an approved model; a rule or a principle that is used as a basis for judgement"⁹

While we believe that the recommendations presented here represent the best possible way of reporting and using data, we realize that complete agreement on every individual point isn't necessary for this work to serve as a "standard." Even where there may be disagreement about the application of a particular term or formula, the difference is made clearer by having a standard against which to contrast the alternative. The NRC offers these definitions, reporting guidelines, and calculation methods in that sense of the term: to serve as a common point of departure.

These concepts will have the best utility if indeed they do achieve widespread adoption, that is, if we all indeed begin to "speak the same language." To accomplish this, your participation is greatly needed to encourage the widespread testing and adoption of the NRC's National Measurement

Standards and Reporting Guidelines. Your reports of experience in applying these concepts in your programs, and your comments and criticism on this document, are invited and will be appreciated, for the preparation of future updates.

VII. Notes

¹ "The National Policy on Recycling" was adopted by the National Recycling Coalition at its Fifth Annual Recycling Congress in Seattle Washington, in November of 1986. Copies of this brochure are available from the NRC.

² At the 1989 Membership Meeting, and in workshops held during the 1989 Congress, consensus could not be reached on these terms because some members expressed the opinion that a definition for integrated waste management must also include a specified hierarchy of priorities for waste management options, whereas others argued that this should be left unspecified. Furthermore, consensus could not be reached in defining the waste management hierarchy, because of lack of agreement regarding the ranking of incineration with energy recovery versus landfilling. These comments were consistent with other comments previously received throughout several drafts of the Standards document. Unchallenged was this portion of the definition:

"The waste management hierarchy is the prioritization of waste management strategies as follows: 1. Decreasing the generation of waste through source reduction, and 2. Decreasing disposal by maximizing materials recovery. "

³ The Glossary of Recycling Terms and Acronyms, contains more than 300 terms and is available for \$5 from Resource Recycling, P.O. Box 10540, Portland, Oregon 97210; 503-227-1319

⁴ This description is a direct paraphrase of comments provided by the Glass Packaging Institute.

⁵ This is a direct paraphrase of commentary provided by Resource Integration Systems/Resource Conservation Consultants.

⁶ A detailed methodology for deriving current recycling rates has been developed by Gilmore Research Group and The Matrix Management Group

APPENDIX II-D
METHODOLOGY FOR SOLID WASTE DIVERSION
Characterization and Calculation Diversion Rate
for County of Santa Clara Study

Methodology for Solid Waste Diversion Characterization County of Santa Clara

Prepared for

The County of Santa Clara
Department of Planning and Development

May 1991

Prepared by

EMCON Associates
1921 Ringwood Avenue
San Jose, California 95131

Project 654-04.01

Printed on Recycled Paper

METHODOLOGY FOR SOLID WASTE DIVERSION CHARACTERIZATION COUNTY OF SANTA CLARA

Background

In January of 1991, the County of Santa Clara retained EMCON Associates (EMCON) to conduct a modified solid waste diversion study limited to data available from

- Local secondary materials market outlets
- Recycling collectors
- Materials brokers
- End users
- California certified redemption centers
- City recycling and composting programs
- Transfer station records
- Hauler records

The objective of the County-sponsored waste diversion study was to provide assistance to jurisdictions within the County in the preparation of waste generation studies as part of the AB 939 planning process. No businesses were surveyed as part of this study.

In accordance with Title 14, Chapter 9 of the California Code of Regulations (CCR), the diversion characterization identifies the composition and quantity of solid waste generated within a given jurisdiction that is diverted

for a continuous 12-month period after 1984 and prior to the jurisdiction's adoption of the Source Reduction and Recycling Element (SRRE). Diversion refers to the measured amount of waste (1) reduced in the jurisdiction, or (2) generated within a jurisdiction and recycled or composted at sites within or outside of that jurisdiction.

Section 18732 of Chapter 9 of the CCR identifies the following methods as being acceptable for determining diversion:

1. Quantitative field analysis, and/or
2. Materials flow with use of current written records from disposal facilities, and/or
3. Existing disposal data from comparable jurisdictions

In conducting the waste diversion characterization for the County, EMCON selected Method 2 (materials flow plus records). The time period selected for the diversion characterization was the 12-month period, January 1990 through December 1990.

The following surveys were undertaken to obtain waste diversion data:

- a mail survey of collectors and processors of recyclable materials, utilizing a material flow methodology;
- a mail survey of City residential and nonresidential diversion programs; and
- a telephone survey of transfer station and landfill operators

Survey Methodology

Recyclers' survey. Initially EMCON developed a survey form for recyclers, brokers, and end users to determine quantities of waste diverted by material type in 1990. To promote participation in the survey, recyclers were informed that the information that they provided would be reported in

aggregate form only, to ensure confidentiality. The survey form identified the need for the following data:

- Business type (e.g., broker, collector, scrap metal dealer, buy-back center, etc.)
- Anticipated percentage increase (or decrease) in recycling tonnage in 1991
- Tonnage of materials collected by type for 1990
- Source of the waste (i.e., residents, commercial businesses, industry, other)
- Purchaser of recyclables (if not end user)

The survey form was reviewed by the County prior to its mailing. Copies of the survey form and the confidentiality agreement are provided in Attachment 1.

A mailing list of recyclers, brokers, and end users of secondary materials in the area was developed from the following sources:

- San Jose State Center for the Development of Recycling
- Santa Clara Valley Manufacturing Group's "Commercial Recycling Guide"
- Sierra Club's "Where to Recycle in Santa Clara County"
- City of Santa Clara's list of recyclers
- Telephone books

The mailing list for recyclers, collectors, brokers, and end users ("Bay Area Recyclers") is provided in Attachment 2.

An additional list of 13 recycling collectors and brokers was developed by referrals from other recycling firms. The names and addresses of these firms are included in Attachment 2.

City programs survey. Next, EMCON prepared a survey form for all the cities within Santa Clara County to obtain data on the quantities of wastes diverted from the residential waste stream (and a portion of the commercial waste stream.)

The survey of city programs requested data on the following residential diversion programs

- Curbside collection program
- Drop-off recycling center(s)
- Buy-back center(s)
- 20/20 center(s)
- Curbside/and waste collection
- Drop-off yard waste program

The survey form sent to cities also requested the following data for commercial-industrial diversion programs:

- Collection of recyclables from commercial businesses by privately owned recycling firms
- Drop-off center(s) for commercial-industrial wastes
- Restaurant-bar glass collection
- High-grade office paper collection
- Cardboard collection program for commercial and retail firms

The County reviewed the survey form prior to its mailing. A copy of the form used to obtain data on these programs is presented in Attachment 1.

The October 1990 mailing list of the Technical Advisory Committee for the Santa Clara County Office of Toxics and Solid Waste Management was the source of the names and addresses for the survey recipients in the

15 jurisdictions within the County. Survey forms were sent to the following:

Campbell - Barbara Lee, City Manager's Office

Cupertino - Bert Viskovich, Director of Public Works

Gilroy - Em Rojas, HCD Coordinator

Los Altos - Bruce Bane, Director of Public Works

Los Altos Hills - Bill Ekern, Director of Public Works

Los Gatos - Regina Falkner, Manager, Community Service Division

Milpitas - Cynthia Rosson, Assistant Planner

Monte Sereno - Rosemary Pierce, Chief Administrative Officer

Morgan Hill - Susan Tosh, Environmental Programs Division, Department of Public Works

Mountain View - Dianne Dryer, Recycling Coordinator

Palo Alto - Mike Miller, Department of Public Works

San Jose - Gary Liss, Solid Waste Manager

Santa Clara - Rick Mauck, Deputy Director/Public Works

Saratoga - Vera Dahle, Solid Waste Program Manager

Sunnyvale - Mark Bowers, Solid Waste Program Manager

Transfer station phone survey . The San Jose Recycling and Transfer Station and the San Martin Transfer Station were surveyed by phone to obtain data from jurisdictions within Santa Clara County that salvage and recycle. Waste types for which data were collected were:

- Metals, including aluminum, tin, and ferrous metals
- Corrugated cardboard
- Wood
- Yard waste

- Glass

Landfill phone survey. The City surveyed operations at the following landfills by phone to obtain estimates of waste quantities diverted from landfilling:

- All Purpose Landfill
- Guadalupe Landfill
- Pacheco Pass Landfill
- Zanker Road Landfill

Data were obtained from landfill operators on the following waste categories for jurisdictions in Santa Clara County:

- Glass, including CA Redemption Value, refillable beverage containers, and other recyclable glass
- Yard waste
- Metals, including aluminum, ferrous, and non-ferrous metals
- Plastics, including HDPE, PET, film, and other plastics
- Wood waste
- Inert solids, including concrete and asphalt

Summary of Survey Results

Survey recipients. A total of 138 recyclers, brokers, collectors, end users, and operators of transfer stations and landfills were surveyed as part of the City's waste diversion characterization. A breakdown by category of those surveyed is as follows:

1. Bay Area Recyclers' List - 119 recyclers, collectors and brokers received surveys.

(A copy of this list is included in Attachment 2).

2. Additional 13 recyclers and collectors (not on Bay Area Recyclers' list).

(A copy of this list is included in Attachment 2).

3. Transfer stations and landfills (a total of 6 facilities).

(A copy of this list is included in Attachment 2).

Survey response. Of the 138 recyclers and operators of transfer stations and landfills who responded to the mail survey and/or phone survey, 49 responded, for a response rate of 36 percent. A breakdown of the responses by category is as follows:

- 132 recyclers, brokers, collectors and end users were surveyed; 41 replied, for a response rate of 31 percent
- 6 operators of landfills and transfer stations were surveyed and all responded, for a response rate of 100 percent.

In addition, all of the jurisdictions within the County responded to the mail survey of recycling and composting programs.

Data Reduction, Interpretation, and Assumptions

Cross checking. To avoid double counting the data provided by recyclers, collectors, and end users, the material flow was charted for each waste type for which information was provided. Data obtained from collectors that reported purchasers for a waste type were eliminated from tabulation when those purchasers also reported data for that waste type. This approach allowed material to be counted only once and quantities to be determined with the best available data.

Data reduction. Waste diversion data were tallied on a spreadsheet form; survey results for recyclers were reported in the aggregate, in compliance with the confidentiality agreement between the consultant

conducting the study and the survey respondents (see Attachment 1). The following data were tallied:

- waste generator, i.e., residential or commercial/industrial
- program type, such as curbside, drop-off, buy-back, or other
- quantitative estimates of materials diverted. Recyclers serving several jurisdictions were requested to provide data specific to each jurisdiction.

Conversion factors. Survey data reported as volumes were converted to weight using conversion factors from The National Recycling Coalition Measurement Standards and Reporting Guidelines, October 31, 1989, as shown in Attachment 3. Source reduction data for diapers was calculated using a conversion factor from a document entitled *Diapers in the Waste Stream*¹. Based on this study, it is estimated that there are 4,500 single-use diapers per ton of garbage. Landfill operators and recyclers also reported the following average weights of specific materials:

battery	44 lbs
mattress	40 lbs
laser toner cartridge	4 lbs. (empty)

Data apportioning and assumptions. When data were available only in the aggregate, EMCON apportioned the data to specific jurisdictions based on the population ratio of those areas for which data were reported, based on ABAG's *Projections '90*.

In reviewing the data provided in the "Diversion Quantities" tables prepared for each jurisdiction, one should note the following assumptions:

1. A column entitled "transformation" was provided in each table to enable jurisdictions to use this table as a model to

¹ Lehrburger, Carl, *Diapers in the Waste Stream: A Review of Waste Management and Public Policy Issues*, December 1988.

record this information for future SRRE revisions. As specified in AB 939, after January 1, 1995, up to 10 percent of transformation (incineration, pyrolysis, and other processes) can count toward the 50 percent diversion target (by 2000), provided that the front-end removal of recyclable materials and other specified conditions are met.

2. The data for landfill salvaging were placed in the commercial table. The suppliers of the data were not able to separate it out by source because of the nature of the operation.
3. Data for industrial wastes are included in the table with commercial waste data (except where specifically listed) because collectors do not distinguish by source in their records.
4. Apartment recycling is generally not reported separately from residential recycling. However, because of the different type of collection system, a column is provided in the diversion data table for each city for separate reporting. One advantage of keeping separate accounting for this material is that a separate public education program is often designed for apartment dwellers, and this accounting would enable tracking of the success of such a program.
5. Data on glass tonnages from some cities were reported as commingled. According to the Department of Conservation (DOC), as of March 1, commingled glass coming from curbside programs is assumed to contain 60 percent California redemption value glass, whereas

commingled glass from a certified redemption center is assumed to contain 75 percent. This percentage is based on a recent survey for DOC and thus used for this study.

6. The results for tires show quantities recycled and transformed. Some tires are sent to Mexico to be recapped. Of the quantity of tires sent to transformation, 25 percent are recovered as casings and used tires before being transformed into electricity. Of the 75 percent transformed, 25 percent is recovered as by-products: gypsum, zinc, and steel. Thus, the data reported were apportioned in this manner.

Method for Calculating Diversion Rate

"Diversion Quantities" tables for residential and nonresidential wastes were prepared for each jurisdiction by tabulating the tons diverted by material type in 1990. These tables can be used by each jurisdiction to calculate percentage diversion rates by waste type after the total waste disposal quantities have been determined.

When combined, the results of the disposal and diversion characterization yield the total amount of solid waste generated, according to the equation defined by AB 939:

$$\text{GEN} = \text{DISP} + \text{DIVERT}$$

- where: GEN = the total quantity of solid waste generated within the jurisdiction
- DISP = the total quantity of solid waste, generated within the jurisdiction, which is transformed or disposed in permitted solid waste facilities
- DIVERT = the total quantity of solid waste, generated within the jurisdiction, which is diverted from permitted solid waste transformation and disposal facilities, through

existing source reduction, recycling, and composting programs.

The methodology for calculating the diversion rate (after the total quantity of waste disposed of by material type for 1990 has been determined by each jurisdiction) is as follows:

- tabulate the tons/year disposed of by waste type and waste generator (residential, commercial, etc.) (Each jurisdiction must determine its waste disposal quantities.)
- tally these disposal quantities by waste type
- in a separate column, sum the quantity of waste diverted for each waste type (data provided by the County as a result of the EMCON waste diversion survey)
- add up the quantities disposed of and diverted to determine the total quantity in tons/year generated by waste type (disposed of + diverted = total generated)
- divide the quantity source reduced, recycled, and composted by the total waste generated to determine the diversion rate [(source reduction + recycling + composting x 100)/total quantity of solid waste generated = diversion rate percent]

Attachment 4 provides an example of a table that illustrates the calculation of diversion rates.

Supplementary Information

The following attachments provide supplementary information on the solid waste diversion characterization conducted for Santa Clara County:

Attachment 1	Survey forms and confidentiality agreements
Attachment 2	Recyclers, collectors, end users, landfill and transfer station operators surveyed

Attachment 3

Conversion factors

Attachment 4

Model for calculating diversion
rate

Attachment 5 - Example of Diversion Rates by Material
(TONS, 1990)

	DISPOSED (a)		DIVERTED (b)		TOTAL GENERATED (c)	DIVERSION RATE (b/c) (percent)
			Recycling	Source Reduction		
PAPER (total)	22,145				30,114	
OCC/Kraft	4,722	4067	0		8,789	46
Magazines	1,028	0	0		1,028	0
Mixed Paper	7,349	0	0		7,349	0
Newsprint	4,006	3261	0		7,267	45
High Grade	804	641	0		1,445	44
Other Paper	4,235	0	0		4,235	0
PLASTICS (total)	6,263				6,315	
HDPE	1,260	0	0		1,260	0
PET	553	52	0		605	9
Film	2,101	0	0		2,101	0
Polystyrene Foam	332	0	0		332	0
Other Plastic	2,016	0	0		2,016	0
GLASS (total)	3,277				5,021	
Refillable Beverage	0	0	0		0	0
CA Redemption Value	477	1744	0		2,221	79
Other Recyclable	2,097	0	0		2,097	0
Other Non-Recyclable	703	0	0		703	0
METALS (total)	3,921				4,835	
Aluminum Cans	221	797	0		1,018	78
Other Aluminum	328	0	0		328	0
Bi-metal Cans	0	0	0		0	0
Steel Food & Bev. Cans	1,478	0	0		1,478	0
Other Ferrous	1,881	117	0		1,998	6
Other Non-ferrous	13	0	0		13	0
White Goods	0	0	0		0	0
YARD WASTE (total)	2,165				2,165	
Leaves and Grass	1,937	0	0		1,937	0
Branches and Brush	228	0	0		228	0
OTHER ORGANICS (total)	18,735				18,746	
Food	10,992	0	0		10,992	0
Rubber/Tires	422	0	0		422	0
Wood	1,126	0	0		1,126	0
Agri. Crop Residue	0	0	0		0	0
Manure	0	0	0		0	0
Textiles/Leather	1,845	8	0		1,853	0
Diapers	3,552	0	3		3,555	0
Other Organics	798	0	0		798	0
OTHER WASTES (total)	1,602				1,602	
Inert Solids	1,441	0	0		1,441	0
HHW	161	0	0		161	0
Appliances	0	0	0		0	0
SPECIAL WASTES (total)	0				0	
Ash	0	0	0		0	0
Sewage Sludge	0	0	0		0	0
Industrial Sludge	0	0	0		0	0
Asbestos	0	0	0		0	0
Auto Shredder Waste	0	0	0		0	0
Auto Bodies	0	0	0		0	0
Stuffed Fur/Mattresses	0	0	0		0	0
TOTAL	58,107	10,687	3		68,797	16

**APPENDIX II-E
COMMERCIAL RECYCLING SURVEY SENT TO BUSINESSES
BY CITY OF SANTA CLARA STAFF AND
SUMMARY OF RESULTS**

THE CITY OF SANTA CLARA

CALIFORNIA

STREET DEPT
CITY HALL
1500 WARBURTON AVE.
SANTA CLARA, CA 95050
(408) 984-3151
FAX (408) 241-8291

Dear Facilities Manager,

The California Legislature has committed all state counties to reducing solid waste landfill disposal by 25% within the next five years. Efforts to reduce, reuse and recycle our limited resources will be necessary.

Commercial businesses and industry generate more than half of the City's solid waste and as such will be major contributors to these efforts.

Since the City is running out of its own landfill capacity and will soon have to rely on more expensive disposal alternatives, it is critical to reduce the amount of waste being buried in landfills.

In order to determine the level of source reduction and recycling currently being done by Santa Clara companies, the City is asking your company to complete the attached short survey outlining your efforts. Please return the survey even if you have no recycling program nor source reduction policy at this time.

Many companies have implemented waste reduction and recycling programs and are enjoying the resultant cost-savings. If you wish to start a program or expand an existing program, please call me at 984-3151 or Staff Aide Annie Horton at 984-5188.

Sincerely,



Richard J. Mauck
Deputy DPW/Street Superintendent

RJM:AZH:cl

Attach

CITY OF SANTA CLARA
COMMERCIAL WASTE REDUCTION AND RECYCLING SURVEY

Company Name: _____

Date: _____

1. The person to contact concerning the contents of this survey:

Name/Title _____

Address _____

Phone No. _____ Hours to contact _____

No. of employees in Santa Clara _____

2. Do you currently recycle any portion of your solid wastes?

☐ Yes ☐ No ☐ Proposed

3. How long has your program been in operation? _____ (yrs./mos.)

4. Please indicate who does your recycling:

☐ Employees ☐ Refuse Hauler ☐ Scavenger ☐ Other

Name of recycler _____

5. Our business currently recycles:

Estimated Annual Quantity Recycled
or Reduced (by weight)

7-1-89 to 6-30-90

(Note if period is different)

<input type="checkbox"/> Aluminum Cans	_____
<input type="checkbox"/> Glass	_____
<input type="checkbox"/> Computer paper	_____
<input type="checkbox"/> White office paper	_____
<input type="checkbox"/> Corrugated cardboard	_____
<input type="checkbox"/> Newspaper	_____
<input type="checkbox"/> Precious metals	_____
<input type="checkbox"/> Scrap metals	_____
<input type="checkbox"/> Plastics	_____
<input type="checkbox"/> Wood (incl.pallets)	_____
<input type="checkbox"/> Appliances/equipment	_____
<input type="checkbox"/> Furniture	_____
<input type="checkbox"/> _____	_____
<input type="checkbox"/> _____	_____

Total

(Include all materials that would normally be discarded that were instead repaired, donated or recycled. Include disposable items for which a reusable substitute has been found.)

CITY OF SANTA CLARA
COMMERCIAL WASTE REDUCTION AND RECYCLING SURVEY
SUMMARY OF RESULTS AS OF 1/21/91

Surveys Sent	1813
Surveys Returned	354
Response Rate (354/1813)	19.5%
Respondents Who Recycle	207
As a percentage of total	11.4%
As a percentage of surveys returned	58.4%
Respondents Who Don't Recycle	147
As a percentage of total	8.1%
As a percentage of surveys returned	41.6%

1. The attached listing is sorted by employee and by company name.
2. All weights are in pounds.
3. Some respondents who indicated that they recycle did not estimate the quantities that they are collecting. Larger companies were contacted and estimates obtained.
4. Companies within the City of Santa Clara with 100 employees or more were contacted by phone if a response was not received. All but 15 have submitted survey responses which are incorporated in the figures above.
5. Companies with locations, both inside and outside the City, may have included recycled materials generated outside in their annual estimates. Companies with large estimates were contacted to make sure only materials generated in the City were included.
6. Commercial sites that serve as drop-off recycling centers, such as churches that collect newspapers to raise funds, may receive materials from outside the City.
7. Hazardous waste recovery was not included in the amounts recycled for the purposes of this survey.
8. Employees taking materials home from work may be recycling through curbside collection or drop-off sites both inside and outside the City.

COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle? Requested?	Aluminum Cans	Computer Glass Paper	White Bond Cardboard Newspaper	Precious Metals	Scrap Metals Plastics	Wood	Equip- ment furniture	Other	Total
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .T.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .T.	.F.	0	0	0	0	0	0	0	0	0
		1 .T.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .T.	.F.	800	200	0	0	2000	500	1000	0	2000
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.F.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0
		1 .F.	.T.	0	0	0	0	0	0	0	0	0

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[illegible]

COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

[illegible]

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Materials Tonnage Report

(NAMES AND TELEPHONE
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Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle? Requested?	Aluminum Cans	Computer Glass	White Bond	Precious Metals	Scrap Metals	Equip-ment	Other	Total
		6 .F.	.F.	0	0	0	0	0	0	0	0
		6 .T.	.T.	0	0	50	0	0	15	0	65
		6 .F.	.F.	0	0	0	0	0	0	0	0
		6 .T.	.F.	50	0	0	0	0	0	0	50
		6 .T.	.F.	0	0	0	0	0	0	0	0
		6 .F.	.F.	0	0	0	0	0	0	0	0
		6 .T.	.F.	0	0	0	0	0	0	0	0
		6 .T.	.T.	0	0	0	0	0	0	0	0
		7 .T.	.F.	0	0	0	20	0	0	0	20
		7 .T.	.F.	0	0	0	0	0	0	0	0
		7 .F.	.T.	0	0	0	0	0	0	0	0
		7 .F.	.F.	0	0	0	0	0	0	0	0
		7 .F.	.T.	0	0	0	0	0	0	0	0
		7 .T.	.F.	20	0	0	0	5000	0	0	5220
		7 .T.	.F.	0	0	0	0	0	0	0	0
		8 .T.	.F.	33	0	0	0	0	0	0	33
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .T.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .T.	.F.	0	0	2700	1800	1200	0	10000	15700
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .F.	.F.	0	0	0	0	0	0	0	0
		8 .T.	.T.	0	0	0	0	0	0	0	0
		9 .F.	.T.	0	0	0	0	0	0	0	0
		9 .T.	.F.	30	0	0	0	0	0	0	530

COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

[illegible]

COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle? Requested?	Aluminum Cans	Computer Glass Paper	White Bond Cardboard Newspaper	Precious Metals	Scrap Metals Plastics	Wood	Equip- ment Furniture	Other	Total
		20	.T. .F.	800	0 0	0 5200	730	0 0 0	0	0 0	0	6730
		20	.T. .T.	0	0 0	0 104000	0	0 0 0	0	0 0	0	104000
		20	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		20	.T. .F.	100	0 0	50 200	0	0 0 0	0	0 0	0	350
		21	.T. .F.	40	0 0	0 0	0	0 0 0	0	0 0	0	40
		21	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		24	.T. .F.	0	0 0	0 108000	0	0 0 0	0	0 0	0	108000
		24	.F. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		24	.T. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
(NAMES AND TELEPHONE		25	.T. .F.	0	0 1000	500 0	0	0 0 0	0	0 0	0	1500
NUMBERS DELETED FROM		25	.T. .F.	120	0 0	0 0	0	0 0 0	0	0 0	0	120
THIS COPY OF RESULTS)		25	.T. .T.	240	2000 0	0 6500	0	0 0 100	0	0 0	0	8840
		25	.F. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		25	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		26	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		28	.T. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		28	.T. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		30	.T. .T.	19	0 40	40 0	80	0 0 0	0	0 0	0	179
		30	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		34	.T. .F.	0	0 0	0 0	0	0 8000 0	3000	0 0	0	11000
		35	.T. .T.	0	156000 0	0 0	0	0 0 0	0	0 0	0	156000
		35	.T. .T.	120	0 0	0 0	0	0 0 0	0	0 0	0	120
		35	.F. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		35	.T. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		36	.T. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		38	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		38	.T. .T.	0	0 0	0 18000	0	0 0 0	0	0 0	0	18000
		40	.T. .T.	0	0 0	0 7300	0	0 0 0	0	0 0	0	7300
		40	.T. .F.	0	0 0	0 0	0	0 0 0	0	0 0	0	0
		40	.F. .T.	0	0 0	0 0	0	0 0 0	0	0 0	0	0

COMMERCIAL RECYCLING SURVEY
Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle? Requested?	Aluminum Cans	Computer Glass Paper	White Bond	Cardboard	Newspaper	Precious Metals	Scrap Metals	Plastics	Wood	Equip-ment	Furniture	Other	Total
(NAMES AND TELEPHONE NUMBERS DELETED FROM THIS COPY OF RESULTS)		40	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		40	.T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		40	.T.	.T.	4000	0	25000	0	0	5000	50000	0	0	0	0	84000
		40	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		44	.T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		45	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		45	.T.	.T.	200	0	0	0	100000	0	0	0	0	0	0	100200
		45	.T.	.T.	0	0	0	0	40000	0	0	0	0	0	0	40000
		50	.T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		50	.T.	.F.	50	0	500	0	0	0	200	10	0	0	0	760
		52	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		55	.T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		60	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		60	.T.	.T.	0	3600	0	0	0	2160	0	0	0	0	0	5760
		60	.T.	.F.	0	0	0	0	400000	0	0	0	0	0	0	400000
		60	.T.	.T.	0	1000	0	0	1200	2000	0	0	0	0	0	4200
		65	.T.	.T.	0	0	0	20000	0	0	0	0	0	0	0	20000
		65	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		67	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		70	.T.	.T.	0	0	7000	0	0	0	0	0	0	0	0	7000
		70	.T.	.F.	0	0	250	0	0	0	1000	0	0	0	400000	401250
		70	.T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		72	.T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0
		75	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		75	.T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		75	.T.	.T.	0	120	600	2400	0	1200	0	0	0	0	0	4320
		80	.T.	.T.	0	0	11200	0	0	0	3556	0	0	0	0	14756
		80	.F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0
		80	.T.	.F.	800	0	100	1000	500	0	300	500	0	0	800	4000
		80	.T.	.T.	1500	0	5500	0	130000	0	0	8	0	0	0	137008

COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle?	Aluminum Cans	Computer Glass	White Bond	Cardboard	Newspaper	Precious Metals	Scrap Metals	Plastics	Wood	Equip- ment	Furniture	Other	Total	
(NAMES AND TELEPHONE NUMBERS DELETED FROM THIS COPY OF RESULTS)		80 .T.	.F.	0	0	0	0	1000	0	0	3000	0	0	0	0	4000	
		80 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	
		85 .T.	.F.	50	10	0	0	2000	100	0	0	0	0	0	0	2160	
		85 .T.	.T.	360	0	0	14400	5400	2160	0	1800	0	2400	0	0	28728	
		90 .T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0	0	
		90 .T.	.F.	92	0	2200	800	0	0	0	1700	0	39000	0	0	0	43792
		90 .T.	.F.	200	500	5000	5000	2000	2000	0	0	0	0	0	0	0	14700
		98 .T.	.F.	69	0	0	0	0	0	0	0	0	0	0	0	0	69
		100 .T.	.T.	0	0	12000	0	0	0	0	0	0	293760	0	0	36000	341760
		100 .T.	.F.	0	0	7200	0	0	0	0	0	0	0	0	0	0	7200
		100 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		100 .T.	.T.	0	0	1440	0	500	0	0	0	0	0	0	0	0	1940
		100 .T.	.T.	0	0	0	0	2020000	0	0	0	1000	6624000	0	0	0	8645000
		100 .T.	.F.	0	0	0	0	0	0	0	2000	0	0	0	0	0	2000
		100 .T.	.F.	0	0	0	8000	0	0	0	0	0	0	0	0	0	8000
		100 .T.	.F.	12900	480000	0	0	104400	0	0	0	22242	0	0	0	0	619542
		105 .T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		108 .T.	.T.	200	0	1000	1000	0	0	0	0	0	0	0	0	0	2200
		110 .T.	.T.	1000	0	0	0	0	0	0	0	0	0	0	0	0	1000
		110 .T.	.F.	0	0	6000	5000	0	0	0	0	0	0	0	0	0	11000
		111 .T.	.F.	250	0	0	14600	2000	0	0	0	0	0	0	0	0	16850
		120 .T.	.T.	524	0	17000	17000	0	0	0	12000	0	0	0	0	0	46524
		120 .T.	.T.	100	0	500	0	500	0	0	0	0	0	0	0	0	1100
		126 .T.	.T.	0	0	24000	24000	0	0	0	0	0	0	0	0	0	48000
		130 .T.	.F.	0	0	15833	15833	0	0	0	0	0	0	0	0	0	31666
		135 .T.	.F.	0	0	73000	73000	0	0	0	0	0	0	0	0	0	146000
		140 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		140 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		140 .T.	.T.	0	0	4800	0	0	0	0	0	0	0	0	0	0	4800
		140 .T.	.F.	0	200000	0	0	40000	0	0	10000	0	0	0	0	40000	290000

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COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle? Requested?	Aluminum Cans	Computer Glass Paper	White Bond	Cardboard	Newspaper	Precious Metals	Scrap Metals	Plastics	Wood	Equip- ment	Furniture	Other	Total
		140 .T.	.F.	0	14400	0	0	0	0	0	0	0	0	0	0	14400
		150 .T.	.F.	0	0	5000	3000	30000	0	0	0	0	0	0	0	38000
		150 .T.	.T.	0	0	5000	0	0	0	300	0	0	0	0	0	5300
		164 .T.	.F.	0	0	0	0	14400	0	0	0	0	0	0	130300	144700
		180 .T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		180 .T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		200 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		200 .T.	.T.	200	0	10000	10000	0	0	10	200	0	0	0	0	20410
		200 .T.	.F.	0	0	0	0	0	0	50000	0	0	0	0	0	50000
		215 .T.	.F.	300	0	0	0	540000	0	0	26000	0	108000	0	0	674300
		220 .T.	.T.	100	0	1000	0	3000	0	0	500	0	1000	0	0	5600
		230 .F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0	0
		250 .T.	.T.	0	0	5000	0	0	0	500	0	0	1000	0	0	5600
		250 .F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0	0
		260 .T.	.T.	0	0	3600	0	0	0	0	0	0	0	0	0	3600
		300 .F.	.F.	0	0	0	0	0	0	0	0	0	0	0	0	0
		300 .T.	.F.	500	0	24000	10000	0	0	0	0	0	0	0	0	34500
		300 .T.	.F.	0	0	0	0	0	0	0	0	0	0	0	0	0
		300 .T.	.F.	0	0	3000	400	0	50	400	0	0	0	0	0	3850
		340 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		350 .T.	.F.	600	0	39000	0	0	500000	0	0	0	9100	0	0	571300
		375 .F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		400 .T.	.T.	1000	4000	6500	6500	0	5200	0	0	0	0	0	0	23200
		400 .T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0
		400 .T.	.F.	0	0	13900	52700	0	0	50	14800	0	0	0	0	81450
		400 .T.	.F.	5772	78000	41600	41600	15600	0	0	0	0	0	0	0	182572
		400 .T.	.F.	0	0	0	0	0	0	44000	21600	0	0	0	0	65600
		400 .T.	.F.	500	0	10000	0	240000	0	0	600000	0	260000	0	0	1150500
		474 .T.	.F.	88	1638	0	67200	0	0	0	2400	0	0	0	0	71326
		480 .T.	.T.	0	0	230000	0	0	0	0	0	0	0	0	0	230000

(NAMES AND TELEPHONE
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COMMERCIAL RECYCLING SURVEY

Materials Tonnage Report

Company Name	Area Telephone Code Number	No. of Employees	Audit Recycle?	Audit Requested?	Aluminum Cans	Computer Glass	Computer Paper	White Bond	White Cardboard	White Newspaper	Precious Metals	Scrap Metals	Scrap Plastics	Wood	Equip- ment	Furniture	Other	Total	
(NAMES AND TELEPHONE NUMBERS DELETED FROM THIS COPY OF RESULTS)		518	.T.	.T.	727	300	12000	12000	0	0	0	0	0	0	0	0	0	25027	
		650	.T.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		700	.T.	.T.	0	0	52000	52000	0	0	0	0	0	0	0	0	0	104000	
		700	.T.	.T.	4000	8000	10000	24000	4000	0	0	0	0	0	0	0	0	50000	
		740	.T.	.T.	2000	0	0	20000	0	0	0	0	0	0	0	0	0	22000	
		750	.T.	.F.	0	144000	0	0	48000	0	0	0	0	0	0	0	0	192000	
		800	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		830	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		900	.T.	.F.	0	0	0	72000	0	0	0	0	0	0	0	0	0	72000	
		900	.T.	.F.	0	0	30000	61600	20000	0	0	0	0	4500	0	0	0	116100	
		900	.T.	.T.	1560	38000	14000	40000	80000	0	0	66000	0	19000	0	0	18020	276580	
		1000	.T.	.F.	120	500	46600	16440	3500	0	0	10020	0	0	0	0	114600	191780	
		1080	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1200	.T.	.T.	1000	0	15000	73000	0	0	51	20000	8000	0	0	0	3815	120866	
		1200	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1200	.T.	.T.	0	0	166400	0	2080000	0	0	0	0	1414400	0	0	0	3660800	
		1500	.T.	.T.	4500	18200	300000	300000	50000	0	50000	400000	0	0	100000	40000	240000	1502700	
		1800	.T.	.F.	0	0	70000	80000	0	0	0	0	0	12000	0	90000	0	252000	
		2200	.T.	.T.	480	540	0	0	0	0	0	0	0	97500	0	0	0	98520	
		2800	.T.	.T.	0	0	48000	48000	0	0	0	0	0	0	0	0	0	96000	
		3000	.F.	.T.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		3320	.T.	.T.	0	0	189000	189000	0	0	0	288217	0	0	0	0	0	0	666217
		3700	.T.	.T.	2400	56000	620000	12000	168000	12000	4800	9600	9600	14400	120000	240000	1200000	2468800	
		4000	.T.	.T.	1000	0	10000	18000	0	0	0	70000	0	0	2000	0	20000	121000	
		51871				60837	1280460	2205563	1437993	6481670	540705	60776	1708901	65562	8977160	324030	375800	2309543	25829000

(NAMES AND TELEPHONE
NUMBERS DELETED FROM
THIS COPY OF RESULTS)

CHAPTER III: SOURCE REDUCTION COMPONENT

Introduction

The California Integrated Waste Management Act (AB 939), requires that source reduction be the highest priority waste handling strategy. Source reduction is the most efficient and least costly method of minimizing waste. It minimizes the amount of waste generated, rather than relying on technologies to handle waste after it has been created.

All waste minimization programs including source reduction are best implemented through a variety of methods. Inefficient use of natural resources in our society is institutionalized, socially acceptable, and profitable. Therefore, to make a fundamental change in our use of natural resources requires political, organizational and social changes. The City needs to effect change in these three areas to successfully promote source reduction. Political change involves regulation and City ordinances to provide residents and corporations with legal impetus for source reduction. Organizational change includes providing economic incentives for source reduction and assistance in implementation. Social change is effected through educational and promotional campaigns to change the way citizens think about resources. These three kinds of change often overlap and coincide. It is useful to approach this issue with the idea that real source reduction will not occur without a comprehensive and innovative strategy that addresses change of all three kinds.

A. Objectives

The City's source reduction programs are designed to achieve the following results:

- Reduce the use of non-recyclable materials
- Replace disposable materials and products with reusable materials and products
- Reuse packaging
- Reduce the amount of yard waste generated
- Increase the purchase of repairable products
- Utilize materials more efficiently in manufacturing

1. Short-Term Planning Period (1991-1995)

During the short-term planning period the City will meet the following source reduction goals:

- a. Develop a publicity and public education program that results in additional source reduction activities by commercial businesses and residents.
- b. Promote and encourage manufacturing source reduction activities to the point that there is a 50% increase in the number of manufacturing firms in Santa Clara engaging in three or more source reduction activities beyond their current activities.
- c. Evaluate the feasibility of revising the City's procurement policies to specify the purchase of supplies, equipment and materials that are durable, recyclable, and reusable, with a maximum of recycled content and a minimum of packaging.
- d. Conduct a waste audit of City facilities and expand source reduction programs based on the results.
- e. Monitor state and federal legislative developments in source reduction regulation
- f. Design and implement a voluntary pilot home composting and yard waste reduction program resulting in 500 households regularly participating in these activities.
- g. Achieve 0.68% of total wastestream diversion through source reduction.

2. Medium-Term Planning Period (1996-2000)

The above goals will be expanded and, if necessary, re-evaluated during the medium-term planning period. In addition, the City plans to meet the following source reduction goals.

- a. Expansion of the public and commercial education program such that at least 50% of residents and businesses surveyed regularly practice source reduction activities begun since the start of the education program.
- b. Raising the number of reporting manufacturing firms with source reduction activities to 80% of the total firms (if required to achieve 50% reduction).
- c. Expansion of the home composting and yard waste reduction program such that 2,000 households participate in composting and yard waste reduction activities by 1997.
- d. Investigate modification of user fee structure for refuse and rubbish collection to provide increased financial incentives for source reduction.
- e. Revisions of the City's procurement policies to specify the purchase of supplies, equipment and materials that are durable, recyclable, and reusable, with a maximum of recycled content and a minimum of packaging.
- f. Achieve 1.27% of total wastestream diversion through source reduction.

3. Targeted Materials

Source reduction is a comprehensive strategy intended to reduce all types of waste. The City is targeting materials where there is a high potential for reduction. The criteria used to identify the targeted waste types include:

- a. Potential to extend the useful life of the material
- b. Whether the material has limited recyclability
- c. Weight and volume of the material in the City's wastestream

Specific materials and items targeted for reduction are:

Paper: Paper accounts for almost half (44.1%) of the City's overall wastestream. Paper is often used inefficiently, for example in packaging.

Plastics: Plastics make up 8.8% of the City's overall wastestream. Plastic items such as containers can often be re-used. Disposable plastic items can be replaced by more durable goods.

Leafy Yard Waste: Leafy yard waste is targeted through backyard and on-site composting. Yard waste comprises 8.5% of Santa Clara's wastestream.

Disposable Products: The City will encourage residents and businesses to switch from disposable products to reusable products. The waste characterization study identified paper and plastic bags, diapers, food containers, and paper towels as products for which durable goods could be substituted.

Packaging: The City will encourage the purchase of items with minimal, reusable, and recyclable packaging.

Wood: Wood makes up 5.6% of the City's overall wastestream. Many wood items and manufacturing wood wastes are reusable, including wood pallets and scrap lumber.

B. Existing Conditions Description

1. Description of Existing Source Reduction Programs

City Policies and Programs

Several source reduction programs exist in the City of Santa Clara as of May, 1991. For example, the City urges employees to make two-sided copies whenever practical. A copy of a memo from the City Manager urging employees to make two-sided copies is presented in Appendix III-A. Single copies of periodicals are routed to several employees to avoid duplicate subscriptions to the same magazine. City offices encourage employees to use ceramic coffee mugs instead of

disposable cups. The City cafeteria offers a discount on beverages for customers who bring their own mugs.

The City is buying recycled materials whenever cost considerations permit. The City obtains bids on both recycled and virgin paper and buys recycled whenever costs are equal. When recycled paper products are more expensive, the City examines each purchase to determine whether the extra cost is prohibitive. The City's 1991 Annual Report and City Calendar were printed on recycled paper. The City Manager has distributed a list of suggestions on recycled materials procurement. This list is presented in Appendix III-B. The City also uses drought-resistant plants for City landscaping. These types of plants produce fewer trimmings and clippings than non-drought-resistant plants.

The City presents a Commercial Integrated Waste Management Award annually to companies that demonstrate achievement in waste reduction. The companies are selected based on the results of the commercial recycling survey. Companies are chosen for their level of source reduction, recycling and composting activities. This year four companies have been chosen to receive the award. Each company will receive a certificate from the mayor at a City council meeting, and the press will be notified about the winners. See Appendix III-C.

Residential Source Reduction

The City charges a volume-based garbage rate for residential garbage service. The charge for the first can is \$4.82 per month. The charge for the second and additional cans is \$4.72 per month. The City also offers unlimited weekly rubbish collection for \$.45 per household per month. Residents may place an unlimited quantity of yard waste, newspaper, and cardboard at the curb for pick-up by the rubbish collection program. The City intends to recommend converting the existing rubbish collection program into a yard-waste-only collection program. The yard waste will be delivered to a composting facility for processing. (A full description of this program is presented in Chapter V, the Composting Component.)

A small number of residents are composting their own organic materials. Some businesses leave grass clippings on their lawns, especially during the current drought. Although the amount of materials reduced this way was not quantified, it is estimated that the amount of material diverted from the landfill through these efforts is small.

Several businesses in and around Santa Clara buy and sell used materials and equipment. Saint Vincent de Paul picks up and sells used clothing, appliances, and other household items which they donate to the needy. Goodwill Industries operates a used clothing and household goods store. These businesses have operated in this manner for years. They fill a demand for low cost goods, and the materials they handle have not traditionally been landfilled. Therefore their

tonnages are not included in the City's existing diversion quantities. These businesses, however, do prolong the life of many types of disposable items.

According to the Waste Diversion Study conducted for the County of Santa Clara by EMCON Associates, the City of Santa Clara diverted 149.6 tons of disposable diapers through the use of cloth diapers in 1990.

Commercial Source Reduction

City of Santa Clara Commercial Waste Reduction and Recycling Survey

Many companies in Santa Clara are developing source reduction programs. To determine the level of business source reduction and recycling activities, the City sent a questionnaire to 1813 companies in Santa Clara asking for information on these activities. A copy of the survey appears in Appendix III-D. A total of 356 companies responded to the survey. Of these, 135 companies indicated that they had recently examined their operations for source reduction opportunities.

Santa Clara County Manufacturing Group

The Santa Clara County Manufacturing Group is a trade association with over 100 member companies. The Group promotes awareness of current issues facing the manufacturing industry, including waste reduction issues. The Group has published a comprehensive waste reduction guide with information on source reduction, recycling, composting, and recycling companies and consultants. The guide is updated periodically, and is available to member companies free of charge. Other interested companies may purchase the guide for \$20.

2. Quantity of Waste Source Reduced By Each Program

It is difficult to quantify diversion rates for source reduction because there is no precise method of measuring the tons of waste not being generated. However, it is possible to make a rough estimate of diversion for several of the City's existing programs using a combination of known facts and informed estimates of waste reduced by various activities.

City Policies and Programs

Diversion for the City's practice of making two-sided copies and reading material routing is quantified by estimating an annual per-employee paper diversion rate. The City offices employ 200 people. Each person saves an average of one ream of paper per year, for a total of 200 reams per year, or approximately 1 ton per year.

Drought-resistant plant diversion is quantified by estimating an annual tonnage of waste eliminated by the use of these plants at City parks and gardens. Yard waste from all city grounds and traffic medians is approximately 2,964 tons per year. Based upon information from the City's Parks and Public Works Departments it is assumed that a 5% reduction occurs through the use of drought-resistant planting. Therefore diversion of yard waste is approximately 148.2 tons per year.

Residential Source Reduction

In the residential sector 149.6 tons of disposable diapers are being diverted annually.

Commercial Source Reduction

Information submitted to the city by companies that responded to the commercial recycling survey was insufficient to quantify the amount of source reduction currently occurring.

Summary of Existing Quantified Waste Diversions

A total of 298.8 tons, or 0.12% has been quantified compared to the total wastestream being disposed.

3. Future Status of Programs

City Policies and Programs

The City plans to expand its office source reduction practices, such as two-sided copying, the use of scrap paper, and drought-resistant planting through further employee education.

Residential Source Reduction Efforts

The material collected by the City's rubbish collection program also contains newspaper and cardboard. By 1995, the City will require residents to put out only uncontaminated yard waste for collection by the program. This will force residents to dispose of all other materials in their refuse. With a volume-based refuse collection fee in effect, residents will have an economic incentive to source reduce and recycle their own waste.

The effects of the drought will continue to cause residents to switch from traditional gardens to drought-resistant gardens. This should continue to reduce the volume of yard waste in the residential sector.

It is assumed that the reduction in the use of disposable diapers through the use of cloth diapers will continue to be static at 149 tons per year.

The City applied for a competitive grant from the Department of Conservation/Division of Recycling to purchase home composting containers to distribute free of charge to interested residents, but was not awarded it for this fiscal year. The City will submit its request again in the future. In the meantime, the City will investigate providing these, at cost, to interested customers (residents).

Commercial Source Reduction Efforts

The City's commercial recycling survey indicates that local companies have a strong interest in and awareness of waste reduction issues. Many companies will likely be expanding their source reduction activities because of pressures on industry and business to become more environmentally aware. Companies are also becoming increasingly aware of the potential cost savings associated with source reduction programs. These types of programs can result in lower materials costs and reduced disposal bills.

The commercial sector will also be affected by the drought and should continue to substitute drought-resistant plants for traditional landscaping.

C. Evaluation of Alternatives

This section presents the evaluation of source reduction program alternatives. An evaluation matrix has been prepared for each program. The matrix contains a numerical score for the alternative based upon the following criteria:

- Effectiveness in reducing the amount of solid waste generated
- Hazard created by the alternative.
- Ability to accommodate changing economic, technological and social conditions
- Consequences of the source reduction alternative on characterized waste. Will it merely shift solid waste generation from one type to another (e.g., switching from paper grocery bags to plastic grocery bags).
- Can the alternative be implemented within the short and medium-term planning periods?
- Will existing facilities need to be expanded or new facilities constructed in order to implement the alternative?
- Is the alternative consistent with applicable local policies, plans and ordinances?
- Are there any institutional barriers to implementing the alternative?
- Estimated cost of implementing the alternative.

Points are assigned for each evaluation criterion on a scale of 1 - 5. A low number of points means the alternative scores poorly on the listed criterion. A large number of points indicates it scores high on that criterion. For example, a program to replace styrofoam coffee cups with mugs in all city offices would be fairly inexpensive to implement so it receives a high score in the Cost of Program category. However, it would divert only a small amount of material from the wastestream, so it receives a lower score for the amount of material to be diverted. The number of points assigned for each criterion depends upon how effective and feasible each alternative is for the specific conditions in the City of Santa Clara.

The evaluation matrices are presented in Appendix III-E.

1. Alternatives Evaluation

a. Rate Structure Modifications

1. Disposal Fee Modifications

Disposal fees have been increased five times in the last seven years. The City could increase the disposal fee at the All Purpose Landfill as part of a strategy to encourage source reduction. Increasing the fee at the All Purpose Landfill would cost the City very little and may have some impact on source reduction as the increased cost is passed on to residents. The increased revenues to the City could be used to fund other programs.

There are, however, several other landfills where the City's haulers dispose of waste, including Newby Island and Kirby Canyon. Therefore, an increase in tipping fees at All Purpose may simply result in disposal at other facilities. Furthermore, this landfill will close in 1993, at which point this program would be discontinued.

The City could explore the possibility of requiring all landfills that accept waste hauled from Santa Clara to charge an increased fee for waste from the City. Many studies have shown that there is a direct correlation between increased tipping fees and increased source reduction and recycling. However, this could involve administrative costs which the landfill operators would charge the City. The City would also incur its own administrative costs for this program. These two costs would reduce the increased revenue the City would receive for the waste disposed. Due to these potential administrative costs, it appears the City might be better served by implementing a garbage rate increase and by handling the administration of the increase in-house.

This alternative scores low on the evaluation matrix with a total of 31 points. This alternative requires no new or expanded facilities, causes no shift in waste type created, and the cost would be moderate. However, the cost-effectiveness of this alternative is questionable. It is very likely that waste would either be routed to another landfill, as in the case of an increase in tipping fees at All

Purpose. This alternative is inconsistent with local practices. It faces institutional barriers such as the accounting systems at the different landfills, which currently charge the same disposal fee for incoming waste regardless of which city it is delivered from (with the exception of the San Jose business tax at the Newby Island and Kirby Canyon landfills). This alternative would also likely face opposition, making it difficult to implement in the short-term.

The evaluation matrix for this alternative is presented in Appendix III-E.

2. Quantity-based User Fees

Quantity-based user fees charge households for refuse service based on the amount of garbage generated. The City's current flat rate-per-can system is a quantity based user fee system. The rate per can could be changed to a variable can rate system. Under a variable can rate system, residents are charged at an increasing rate for each additional garbage can. For example, the charge for one can would be \$5, the charge for two cans, \$12, and the charge for three cans would be \$21.

Another option for the City is to add a very low collection fee option for residents who generate very low volumes of garbage. This would reward the extremely conscientious citizens who recycle and reduce the majority of their trash, and would provide a low-cost billing option for low and fixed income residents.

A variable can rate would cost relatively little to implement and could provide a strong incentive for residents to reduce and recycle. It would also educate the consumer about the rising costs of solid waste disposal. A variable can rate would focus residents' attention on waste reduction better than a flat rate-per-can system. Studies of communities with volume-based garbage collection fee systems show that these communities have higher recycling rates than those with a flat-fee structure. While a flat rate-per-can is a type of volume-based fee system, a variable can rate provides an even greater financial incentive to the customer because of the progressive increase in collection fees.

The main disadvantage of a variable can rate is a possible increase in illegal dumping. Refuse might be dumped in unlocked bins located at businesses, or on roadsides or vacant lots. The City might need to budget funds to clean up illegally dumped waste and to police unlocked dumpsters in the community. Local laws on dumping would need to be examined to determine whether they are stringent enough to discourage illegal dumping.

A variable can rate could adversely impact the City's composting plan by causing residents to dispose of non-yard wastes in the rubbish program. This would contaminate the green waste and degrade the quality of the finished compost product. This would also increase the rubbish collection program costs.

This alternative has a moderate score on the evaluation matrix with a total of 35 points. The advantages of this alternative are that it is a flexible system, it causes no shift in the types of waste created, it is implementable in the short-term, and requires no new or expanded facilities. It is consistent with local plans, however the ordinance setting garbage rates would need to be revised. The drawbacks of this alternative are uncertain costs (if illegal dumping or rubbish contamination result), a possible hazard of illegally dumped waste, uncertain impacts on source reduction, and possible institutional barriers since this alternative could be politically unpopular.

The evaluation for this alternative is presented in Appendix III-E.

3. Weight-based Fee System

In a weight-based fee system a resident's trash is weighed as it is picked up, and fees are charged accordingly. A truck with a scale and data entry system collects waste and records the weights for each household. This system is attracting the interest of many municipalities in the country. Two cities, Seattle, Washington, and Farmington, Minnesota, are currently conducting pilot programs for a weight-based fee system.

The advantages of this alternative are that it provides the most equitable system of garbage service fees and a strong incentive to reduce waste. Residents are charged for the precise amount of waste disposed, resulting in reduced garbage fees for even a small degree of waste reduction. Often residents do not take the first steps towards recycling and source reduction because there is no financial benefit. Even with a variable can rate, a household must often reduce its waste substantially to qualify for a smaller can or fewer cans. A weight-based fee system would provide these residents with an immediate and tangible economic benefit for waste reduction. This system would also educate residents about the rising costs of solid waste disposal.

This alternative has a moderate score of 35 points on the evaluation matrix. This alternative would have a strong impact on waste disposal, is flexible, causes no shift in waste type created, and the alternative is consistent with local plans. The garbage rate ordinance would need to be modified, however, to reflect this new system.

The principle drawback to this alternative is its high cost. The City would have to spend \$5,000 to \$10,000 per truck to implement this system for city-wide residential collection. This would result in a total cost of \$30,000 to \$60,000 to equip all six residential refuse collection vehicles with scales and data entry systems. Additional costs due to increased time on routes could also be incurred. This alternative has the potential drawbacks of a variable can rate, including a possible increase in illegal dumping, and contamination of green waste put out for rubbish collection. There may also be institutional barriers. It would require training for both City employees and hauler employees in order to utilize new processing and accounting systems.

This system could be kept in mind as a future alternative when the cost is less prohibitive, and the City has reviewed the feasibility of other, less costly rate structure modifications.

An evaluation of this alternative is presented in Appendix III-E.

b. Economic Incentives

1. Loans, Grants and Loan Guarantees.

The City could provide loans, grants or loan guarantees to businesses or organizations for source reduction programs. For example, the City could provide low-interest loans or loan guarantees for companies to purchase source reduction equipment such as an electronic mail system. Alternatively, the City could create a grant program to help fund the purchase of durable products or for equipment that could help source reduce waste, such as a two-sided copier. A grant program could be provided for large employers for the purchase of coffee mugs and dishwashers. These programs could also be combined with a program to provide funds for the purchase of recycling equipment.

The advantage of these programs is that they provide funds for companies that are interested in source reduction, but for which the cost is prohibitive. Many companies cannot justify budgeting funds for source reduction, especially during the current recession. These programs would also demonstrate to the business community the City's firm commitment to waste reduction.

The loan programs are potentially problematic because it is not the City's normal function to provide loans to businesses. Loans for business activities almost always come from the private sector. Implementing these programs could be time-consuming for the City because it would be engaging in a completely different function from its current activities. The loan programs would require employee training and new accounting systems.

Offering grants to the business community is a more feasible option because unlike a loan, there is little administration needed after the grant is awarded. The City could establish a fund of \$25,000 that would be distributed to selected companies or non-profit organizations that submitted an application detailing how the money would be used, how many employees would participate in the program, and an estimate of the number tons of waste avoided. However, the City has very limited funds available for grants, and the City has not traditionally been a source of commercial grant monies. There would be the additional cost of designing appropriate selection criteria. The limited amount of funds that the City could provide for grants might have only a small impact on waste reduction. A grant program would have an important symbolic element, however, because it would send a strong message to the business community about the importance of source reduction.

This alternative scores fairly low on the evaluation matrix with a total of 34 points on the evaluation matrix. This alternative creates no hazard, and is flexible because the criteria for awarding loans and grants could be changed as conditions warrant. This alternative causes no shift in waste type created, is implementable in the short-term, and requires no new or expanded facilities. However, the alternative is inconsistent with local plans and policies and would face the potential institutional barrier of lack of City expertise in loan administration. Given the City's current budget, grant funds would be difficult to justify. The cost-effectiveness of this alternative (dollar cost per avoided ton) would be fairly low.

An evaluation of this alternative is presented in Appendix III-E.

2. Deposits, Refunds, and Rebates

These incentives include charging a fee at the point of purchase which is refunded when an item is brought to a collection point, and offering a sum to consumers to bring certain items to a collection point. An example is the state beverage container redemption system. In general, these types of systems provide a financial incentive to residents to bring recyclables directly to collection programs. In the case of deposits, the costs of disposal are incorporated into the purchase price of the item.

These incentives are problematic at the local level, and usually operate at a state or regional level. A state agency has jurisdiction over a large region, making it more feasible for manufacturers to comply with regulations. The economic boundaries of a City are too small to effectively impose a deposit or refund program without a high level of effort and cost. A rebate program is a more feasible local option. For example, the City could sponsor an appliance rebate event where residents bring their old appliances in for a small rebate. An agency such as St. Vincent de Paul or Goodwill could organize the event in return for the appliances.

Another option is for the private sector to implement these programs. For example, fast food retailers could serve food in reusable containers and charge a small deposit for the container. Customers who brought in the containers for reuse could reclaim their deposit. Grocery stores could offer a discount to customers who brought their own bags. Coffee shops could reduce the price for beverages to customers who bring their own mugs. The City could encourage the private sector to adopt these programs through the commercial education and promotion campaign.

This alternative scores low on the evaluation matrix with a total of 32 points. This alternative creates no hazard and requires no new or expanded facilities. This alternative would have a modest impact on waste reduction, and may cause some shift in waste type created since only selected materials or products would be included in these programs. This alternative is somewhat inflexible because deposits and refunds are most often applied to specific products. The program

may be difficult to implement in the short-term. A program run by the City would be inconsistent with local policies, and would face some institutional barriers. Programs run by the private sector would be less problematic. The City currently has no systems in place to administer a deposit or refund program, and while private programs are very desirable, the City currently has only a small influence over the adoption of these programs. Internal City programs for deposits, refunds, and rebates would all be difficult to design and administer, and their impact on waste reduction would be minimal in the short-term.

An evaluation of this alternative is presented in Appendix III-E.

3. Reduced Business License Fees

The City could offer reduced business license fees to firms that met a given standard for source reduction activities. The City could also increase the fee for businesses that did not meet the standard. For example, the City could offer a reduced fee to businesses that have a lower rate of waste generated per employee than the industry average. A simpler standard would be to reduce the fee to businesses that own two-sided copiers and electronic mail systems. Another alternative is to lower the fee to businesses that submit a source reduction and recycling plan to the City upon applying for or renewing their business license.

Economic incentives are always highly motivating for businesses. However, City business license fees are already very low. The maximum business license fee in the City is \$95 per year. Therefore, this alternative would provide little incentive even if fees were cut by 50% for businesses implementing source reduction practices. Additionally, this program would be time consuming to administer. The impact on source reduction could be minimal.

This alternative a total of 34 points on the evaluation matrix. This alternative creates no hazard, is flexible, causes no shift in waste type created, and requires no new or expanded facilities. However, the impact on waste reduction would be slight, and it could be quite costly to design and administer the program. It is not consistent with local policies. The program and faces institutional barriers such as the need to be integrated into the existing business license system.

An evaluation of this alternative is presented in Appendix III-E.

c. Technical Assistance/Instruction and Promotion

Technical assistance programs are essential to an effective source reduction campaign. The City must provide individuals and organizations with information on what they can do to bring about source reduction. Technical assistance programs educate and inform the public and the business community about the many methods for reducing waste before it is generated. Included in the technical assistance programs are waste evaluations, residential and business composting assistance, technical assistance to industry, non-procurement program assistance, education,

awards and public recognition. Each alternative is evaluated separately on the matrix in Appendix III-E.

1. Waste Evaluations for Businesses

A waste evaluation provides an analysis of a firm's or organization's solid waste in terms of composition, volume and potential for recycling and source reduction. The firm uses the waste evaluation results to determine the feasibility of waste reduction programs. For example, if a waste evaluation indicates that a firm has a large percentage of uncontaminated cardboard in its waste stream, then the firm can implement a program to separate the cardboard from the waste for recycling or modify its procedures to reduce the volume of cardboard disposed. The appropriate program for each individual firm can be determined through a cost-benefit analysis performed as part of the waste evaluation. The waste evaluation provides the foundation data necessary to design a successful source reduction and recycling program.

The City's new franchise agreements with its haulers and recycling companies will offer a reduced franchise fee to companies that provide waste evaluation services to their customers. The City could require that the evaluation program be expanded to include training companies in source reduction techniques such as the utilization of reusable shipping containers, reusable and minimized packaging, electronic mail, and on-site composting. The City could also provide additional waste evaluation services to augment the haulers' programs.

The advantage of the City providing complementary or additional waste evaluation services is that the City would obtain a database of information about its commercial waste stream. It would also provide information on companies that have implemented source reduction activities.

This alternative scores a total of 34 points on the evaluation matrix. This program creates no hazard, is very flexible to changing conditions, and causes no shift in waste type created. The program can be implemented immediately. The disadvantages of this program are that there would be some administrative costs, and the impact on the amount of solid waste disposed would be moderate at first. This program is not consistent with local policies since the City does not provide this type of service to the business community. This program faces an institutional barrier, which is the availability of waste evaluation services from the City's haulers and recycling companies. Considering that the City's haulers and recycling companies already offer waste evaluation services to the business community, the City's limited funds should be spent on a source reduction program not currently in place.

An evaluation of this alternative is presented in Appendix III-E.

2. On-site Composting Assistance to Businesses

On-site composting is defined as a source reduction activity by the AB 939 regulations because it reduces waste at the source and requires no additional processing or handling. On-site composting is a new activity for most businesses. A careful instructional and promotional program is necessary to encourage this activity. Santa Clara is located in a very urbanized area, and many businesses do not have the necessary space to do on-site composting. Those that do, such as hotels, should be encouraged as much as possible.

Often an economic incentive is required to convince businesses to start composting programs. As an example, some cities are considering increasing tipping fees for disposal of yard waste to encourage on-site composting programs. The City of Santa Clara does not currently have such an incentive beyond the normal fees charged by landscapers to dispose of trimmings and leaves. Nonetheless, on-site composting should be encouraged because of its ecological benefits, and to help instill a sense of responsibility for the environment in the business community.

The City's water supply, and that of surrounding jurisdictions, has been severely reduced by the drought. Consequently, businesses have even more incentive to compost their green waste because it provides a rich topsoil that can be used to help retain moisture in drought-depleted gardens and grounds. Municipalities are increasingly turning to on-site composting as a method of source reduction because of its ecological and educational value. As an example, Alameda County is investing \$149,000 to establish four backyard composting demonstration sites and to offer free workshops on composting techniques.

The City could provide assistance to businesses to begin on-site composting programs. The assistance program could provide businesses with information on the economic benefits of on-site composting, how to set up a system, and applications for the finished product. The City could hire or train staff on commercial composting techniques and offer to visit interested firms and give advice on how to set up a compost program. The City could also provide demonstration sites at City parks and gardens. Workshops could be sponsored to teach businesses how to compost. Most businesses hire a gardener or landscaper to tend to their grounds. This fact would need to be considered when designing a composting promotion program aimed at businesses.

This alternative scores a total of 34 points on the evaluation matrix. It would reduce the quantity of yard waste disposed of by businesses. The amount reduced would be expected to increase over time as more businesses are added to the program. The alternative would create no hazard and is flexible to changing conditions. It would not shift the type of waste created, and a limited amount of new facilities and staff would be required. The alternative would complement the publicity efforts in progress concerning the drought. This alternative is not consistent with local plans because the City does not provide this kind of technical assistance to the business community. The largest institutional barrier would be to assist businesses in getting their landscape contractors to participate in the on-site composting program. The cost of the program

will include staff training and time to oversee the program, and promotional and informational materials.

The evaluation matrix for this alternative appears in Appendix III-E.

3. Backyard Composting

Backyard composting is also defined as source reduction by AB 939 regulations. Cost, odors, lack of space and level of effort required are factors most often cited as impediments to backyard composting. Concerns about odors and level of effort can be addressed through education. Homeowners can be encouraged to mulch their clippings and leaves to retain moisture and insulate plants from temperature extremes. This is a simple method of yard waste handling, but it does not divert large volumes of green waste or shrubby debris. The City is awaiting approval of a request submitted to the Department of Conservation for funds to purchase composting bins to distribute to residents. Providing free bins to residents would be a strong encouragement to begin composting.

The City could also encourage backyard composting using the following methods:

- a. Include informational materials on composting with the curbside program mailings, utility bills, and the city newsletter, "Mission Scenes". Informational materials would discuss the following:
 - Various composting techniques, costs, levels of effort required, and quality of resulting compost material
 - Leaving grass clippings on the lawn
 - Using yard waste as mulch to spread on the soil surface to insulate plants and reduce evaporation
 - Switching to drought-resistant vegetation
- b. Assign a staff person in the recycling program to answer questions on composting. Provide a special composting "hotline" number.
- c. Sponsor composting projects in visible areas like City parks and gardens.
- d. Set up composting classes, where experts train residents in composting.

This alternative scores fairly high on the evaluation matrix with a total of 39 points. The alternative creates no hazard and is a flexible system. There is no shift in waste type created, and the program can be implemented in the short-term. A limited amount of new staff resources, equipment, and facilities are required. The program is consistent with local policies.

The drawbacks to this alternative include the cost for hiring or training City staff to manage the program, designing and distributing promotional materials, and maintaining demonstration sites. The quantity of waste reduced may not be significant in the short-term. There is a significant institutional barrier because a very low-cost method of yard waste disposal is available to residents through the City rubbish collection program.

An evaluation of this alternative is presented in Appendix III-E.

4. Technical Assistance to Industry, Consumer Organizations, and Source Reduction Businesses

A technical assistance program offers companies and organizations information and training concerning specific methods of source reduction. This can include procurement policies, system and process modifications, and materials handling changes. This program would provide source reduction assistance to all firms and organizations in the City including businesses, non-profit organizations, health care facilities, community groups, and schools. The technical assistance programs can be implemented in various ways. For example, the City could hire and train staff to offer individual assistance to requesting organizations. The City could assemble and distribute general informational materials on source reduction, or materials specifically designed for a particular industry, such as fast food or manufacturing. The City could coordinate with the Santa Clara County Manufacturing Group to operate assistance programs. The City could promote the Group's existing guide to waste reduction. The City could form a task force with other cities in the County that would provide technical assistance to companies in Santa Clara County. This program could include assistance on recycling program development.

The assistance program could provide information on the following source reduction techniques:

a. Procurement policy design

Information on how to design a procurement policy that specifies the purchase of durable, reusable, recyclable, and recycled materials.

b. System and process modifications

Redesigning materials handling and inventory systems so that supplies are purchased in bulk, shipping containers are reused, and industrial scrap is minimized.

c. Other non-procurement programs

The use of two-sided copiers, coffee mugs, re-use of paper, electronic mail, cloth towels instead of paper towels, etc.

d. Waste exchange

The City could start a waste exchange publication where firms could list used materials for sale or for free.

The City could also offer assistance to source reduction businesses. Currently there are no such companies in the City, but an offer of assistance could encourage such businesses to locate there. An existing company might decide to start a source reduction subsidiary. For example, a garden supply firm could open a store that sold only drought-resistant plants and water-saving irrigation systems.

The technical assistance program alternative scores a total of 34 points on the evaluation matrix. This alternative creates no hazard, and is flexible to changing conditions because the assistance programs can be modified as new source reduction techniques become available and economical. There is no shift in waste type generated, and the alternative is implementable in the short-term. No new or expanded facilities are required. The disadvantage of this alternative is its cost. An effective technical assistance program requires specially-trained personnel and extensive promotional and informational materials. The City does not typically provide this kind of specialized technical assistance to the private sector, making this alternative inconsistent with local policies. The City might wish to explore other options besides providing an extensive technical assistance program.

An evaluation of this alternative is presented in Appendix III-E.

5. Educational Efforts

The City could develop a comprehensive public education and awareness campaign designed to promote source reduction activities by businesses, consumers and industry. The campaign would coordinate enhancement of the various City source reduction policies and programs. An education and awareness campaign would help bring about the various behavior changes necessary for source reduction.

Education is the cornerstone of a source reduction effort. Any source reduction program needs a complementary education program to succeed. Source reduction is an entirely new concept to many individuals and organizations. The educational program needs to stress the fact that each individual and organization has an impact on solid waste. For example, flyers and posters could illustrate how many disposable cups are saved by using a coffee mug at work for a year, or how many trees are spared by purchasing one ton of recycled paper.

a. Consumer Education

An education program could give residents reasons to change their purchasing behavior, which is the consumer's most powerful tool. An environmentally educated public is one of the most crucial elements of a waste reduction strategy. The education program could provide specific information on what to purchase, how to judge a product's environmental costs, which companies to patronize, and where to buy "green" items. The city has already sent one utility bill insert

urging residents to reuse and reduce waste (see Appendix III-F). Most people are reluctant to make source reduction efforts because they feel that one person cannot make a difference. An educational campaign could help dispel these feelings by providing graphic illustrations of what one individual can do.

b. Business Education

A campaign for business education about source reduction would complement the consumer education program and encourage businesses to expand or embark on source reduction programs. Businesses and organizations account for the majority of Santa Clara's wastestream. Changing business behavior will have the biggest impact on source reduction quantities. The business education program could include development of a brochure on source reduction ideas and workshops on source reduction methods.

The business and consumer education programs are evaluated as one program on the evaluation matrix. This alternative scores very high with a total of 42 points. This alternative creates no hazard and is flexible. It can be redesigned as changing conditions dictate. There is no shift in waste type created, and the program is implementable in the short-term. No new or expanded facilities are required. This alternative is consistent with local policies, and faces virtually no institutional barriers. The only drawback to this alternative is that to be effective, funding will be required.

An evaluation of this alternative is presented in Appendix III-E.

6. Awards And Other Public Recognition For Source Reduction

The City currently presents Commercial Integrated Waste Management Awards annually to companies that demonstrate achievement in waste reduction. The companies are selected based on the results of the commercial recycling survey. Companies are chosen for their level of source reduction, recycling and composting activities. This year four companies have been chosen to receive an award. Each company will receive a certificate from the mayor at a City council meeting, and the press will be notified as to the winners. Awards for source reduction activities help educate the public about source reduction by providing specific examples of firms with successful programs. Awards offer recognition to firms which have adopted source reduction programs, and would provide an incentive to other firms to adopt similar programs.

The City could expand the awards program by:

- Budgeting funds for engraved plaques for the winning firms
- Increasing promotion and publicity for the awards ceremony and the selected firms

- Holding a separate event solely for the purpose of presenting the awards with a luncheon or dinner, speakers, and media coverage.

This alternative scores high on the evaluation matrix with a total of 41 points. This alternative creates no hazard and is flexible due to the fact that award criteria can be changed as needed. There is no shift in waste type created. The alternative is implementable in the short-term, and no new or expanded facilities are required. The alternative is consistent with local policies since the City already sponsors an award program. Enhancement of the awards program would not have a significant impact on waste reduction by itself, but it would help publicize source reduction efforts. There would be a moderate cost for expanding the current awards program.

An evaluation of this alternative is presented in Appendix III-E.

d. Regulatory Programs

1. Procurement Ordinances

The City could adopt ordinances to specify that one or more of the following criteria be considered in the procurement of products and packaging for City offices and operations:

- Durability
- Recyclability
- Reusability
- Recycled material content

Currently, most recycled products and most items with a percentage of recycled content are more expensive than virgin materials. However, many recycled items such as paper can be purchased at similar or only slightly higher costs than virgin items. As more cities adopt procurement ordinances specifying recycled content, markets for recycled items will develop and prices will fall. Since cost is an important issue for Santa Clara, the City could phase in these policies gradually and implement more aggressive policies as market conditions permit.

Procurement policies aimed at waste reduction must specify a price preference for recycled items since these items are almost always more expensive than virgin materials. This type of policy would be a deviation from the City's current purchasing policies, where supplies are almost always purchased from the lowest bidder. California State regulations allow jurisdictions to specify a price preference for recycled materials.

In addition, the procurement ordinance should stress purchase of durable materials in place of waste-producing materials. For example, the City could purchase dryers for installation in restrooms in city offices and eliminate the purchase of paper towels.

This alternative scores moderately on the evaluation matrix with a total of 37 points. A waste reduction procurement policy would have a significant impact on developing markets for recycled materials and minimizing waste. This alternative creates no hazard. The procurement ordinance can be modified if needed due to changing market conditions. There is no shift in waste type created, and the program is implementable in the short-term. No new or expanded facilities are required. Difficulties in implementation of this alternative include a lack of consistency with existing purchasing policies because none of the City's other purchasing policies specify a price preference for certain materials. The cost of this alternative could be significant, depending on how much more the City must pay for appropriate materials. Staff time would be required to design the procurement policy and have it adopted by the City Council.

An evaluation of this alternative is presented in Appendix III-E.

2. Establish Incentives and Dis-incentives to Land Use Development that Promote Source Reduction

Through the use of ordinances, permit application processes, and economic incentives, the City could promote source reduction in land use development. For example, the City could require all city-owned land to be planted with drought-resistant landscaping. City ordinances could also require all developers and landscapers to use a certain percentage of such plants in new developments and existing grounds. New commercial developments could be required to have a composting area with bins already in place.

Other types of source reduction incentives that the City could offer include:

- Modification of zoning laws to specify a certain percentage of redevelopment and remodeling, versus demolition.
- Modification of City specifications to require that any recyclable demolition materials be separated and taken to a recycling facility instead of a landfill.

This alternative scores a total of 34 points on the evaluation on the evaluation matrix. This alternative creates no hazard, and can be somewhat flexible to accommodate changing conditions. It causes no shift in waste type created, and no new or expanded facilities are required. However, the impact on waste avoidance is uncertain in the short-term. During the medium-term, the City will have had a chance to develop workable incentives and policies that achieve source reduction. This alternative could take a long time to implement due to institutional barriers such as a lack of examples for the City to follow. The City would also incur some costs for designing the program.

An evaluation of this alternative is presented in Appendix III-E.

3. Requirements for Waste Reduction Plans

Business source reduction activities are difficult to quantify. The City's commercial recycling survey has provided an estimate of the number of firms pursuing source reduction, but it did not generate data on the amount of waste reduced or the specific programs implemented. Santa Clara could require that all companies holding a Santa Clara business license that have an office or a physical site within the city submit a Waste Reduction Plan to the City. Company plans would include waste reduction programs, tonnages diverted, and diversion goals. Information from the plans could be entered into the City's database. Companies could be required to submit a report describing the amount of waste they reduced and diverted with the annual renewal of their business license. Company waste reduction plans would greatly facilitate the City's AB 939 monitoring program by providing information on business source reduction and recycling activities.

This alternative scores 38 points on the evaluation matrix. The alternative would create no hazard, can accommodate changing conditions, and causes no shift in waste type created. It can be implemented in the short-term, and requires no new or expanded facilities. This program would be a change from existing local policies. The main institutional barrier facing this alternative would be the business community's lack of experience in writing such plans. The cost of this alternative would be mid-range as compared to other alternatives. Costs would include administration, employee training, and access to a computer and software to input and manage the database.

An evaluation of this alternative is presented in Appendix III-E.

4. Bans on Products and Packaging

Bans are one of the most extreme measures available to cities concerned with reducing certain types of waste. They are often one of the first approaches to be considered. This is due to the fact that bans are relatively easy to enact. However, bans may be ineffective, especially on the local level. For example, several cities around the country have banned polystyrene foam food containers. This simply results in substitution of paper waste for polystyrene waste. Bans can also be expensive to enforce if affected local businesses are not amenable to abiding by the new law.

The City could use the threat of bans to induce industry to make more environmentally sound products. The rash of polystyrene foam bans around the country has caused the plastics industry to stop using chlorofluorocarbons (CFC's) in the manufacture of this material. CFC's have now been eliminated from almost all polystyrene foam manufacturing.

The City could use bans both as a method of reducing waste, and as a threat to cause industry to change to more environmentally sound processes and products. The City could also explore the feasibility of banning non-recyclable packaging material, rather than banning specific materials such as polystyrene.

This alternative scores very low on the evaluation matrix with a total of 28 points. The alternative creates no hazard and requires no new or expanded facilities. These programs could be implemented quickly. However, there would be a fairly significant cost for enforcement and compliance monitoring. A ban might not achieve a reduction in waste quantities, especially if specific materials were banned, and a corresponding shift in waste type occurred. Bans are also not consistent with local policies.

An evaluation of this alternative is presented in Appendix III-E.

5. Legislative Support

Since legislation is most effective on the regional or state level, the City could work with other jurisdictions to support and lobby for source reduction legislation. A staff person could be assigned to track state legislative developments through the League of Cities Legislative Bulletin, and to distribute information to other staff. This would assist the City in its AB 939 planning and designing local waste reduction policies that complement and promote state regulations. When bills of special importance were identified, staff could notify the City Manager and City Council so the City could take an official position in support of such bills.

This alternative scores high on the evaluation matrix with a total of 42 points. This alternative creates no hazard. It is flexible and can reflect changing conditions. It would cause no shift in the type of wastes created. A legislative support program can be implemented immediately, and requires no new or expanded facilities. It is consistent with local policies and faces no institutional barriers. The cost for this program would be minimal. The only drawback to this alternative is that it would result in very little waste reduction in the short-term. However, this alternative would improve the City's long-term capabilities to design source reduction programs by providing a vital base of knowledge about state legislation on source reduction and recycling.

An evaluation of this alternative is presented in Appendix III-E.

e. Other Programs

1. Expansion of City Offices Source Reduction Activities

The City could expand the source reduction activities at City offices to increase the participation rate in these activities and provide a good example to the residential and business communities.

The City could either promote and encourage its current source reduction activities, or implement additional measures such as an electronic mail system.

This alternative scores high on the evaluation matrix with a total of 42 points. This alternative creates no hazard, is flexible to changing conditions, and causes no shift in waste type created. It is implementable in the short-term period, and is consistent with local plans. There are no institutional barriers. This alternative would not have a significant impact on waste generation. There would be a cost in staff time to conduct waste evaluations at city facilities and implement expanded programs. This program would provide a positive example to the business community, and would demonstrate the City's commitment to source reduction.

An evaluation of this alternative is presented in Appendix III-E.

2. Program Selection

The City's source reduction program is focused on education and promotion as the principle vehicles for achieving source reduction in the community. The most important criterion used to evaluate the potential program alternatives was cost-effectiveness. The City wants to implement programs that will divert the maximum amount of waste at the lowest cost.

The City's source reduction programs are designed to achieve the following goals:

- Develop a new awareness in the business and residential communities of the impact of individual behaviors and lifestyles on waste generation
- Promote a stronger sense of responsibility for the environment
- Instill a sense of urgency in the business community to adopt source reduction programs to avoid future regulations and to demonstrate environmental leadership

This section presents a description and justification for the selection of source reduction alternatives which will be implemented. Programs which scored 38 points or higher were selected for implementation. Programs which scored 35-37 points on the evaluation matrix were selected for program feasibility evaluation. The selected alternatives are as follows:

- Evaluate Feasibility of Quantity Based User Fees
- Residential Backyard Composting Program
- Consumer Education Program
- Business Education Program
- Awards and Public Recognition Program

- Evaluate Feasibility of Procurement Ordinance
- Expand City Source Reduction Programs
- Legislative Support
- Voluntary Submission of Waste Reduction Plans

The following section describes each program, the justification for its selection and the projected quantity of solid waste it will divert.

a. Evaluate Feasibility of Quantity-based User Fees

Description:

The City intends at a minimum, to retain at least a flat rate per can system but will evaluate the feasibility of a variable can rate for residential garbage service. The City will study the issues of whether a variable can rate will result in an increase in illegal dumping, and whether program funding would be available. The City will survey residents, haulers and landfill personnel to evaluate the relation of potential illegal dumping to a variable can rate. The City will examine other jurisdictions which have established variable can rates to determine whether illegal dumping or other problems were encountered and how these problems were solved.

The City will simultaneously monitor jurisdictions utilizing a weight-based fee system (such as that used by the city of Seattle). Weight-based fee systems are still undergoing technological development. These systems are currently somewhat expensive. In the future these systems may become more economical and efficient. The City will evaluate the feasibility of using a weight-based system versus a variable can rate or a flat rate per can. Upon completion of the evaluation, staff will make a recommendation to the Director of Public Works concerning whether to change the residential garbage rate system.

Justification:

The City currently has a flat rate-per-can for residential garbage service, providing a financial incentive for residents to reduce the volume of their waste. An increasing variable can rate, or a weight-based fee system, would present an even stronger financial incentive to reduce waste. These types of systems could have a significant impact on residential waste generation in the city.

Projected Diversion:

The projected diversion for this program will be quantified as part of the City's evaluation of the feasibility of this alternative.

b. Residential Backyard Composting Program

Description:

The City will implement a backyard composting program which will:

1. Include informational materials on composting with utility bills or other City mailings.
2. Assign a staff person in the recycling program to answer questions on composting.
3. Sponsor composting demonstration projects in visible areas like City parks or gardens.
4. Set up a composting assistance program, where experts train residents on composting.

The informational materials will discuss various methods of home composting and other yard waste reduction techniques such as mulching and drought-resistant planting.

Justification:

Backyard composting is an important part of the City's source reduction program. Backyard composting provides residents with a method of processing their own waste and actively contributing to source reduction. Backyard composting is extremely desirable from an ecological standpoint because it helps nourish soil while diverting waste from landfills. It also complements the City's education efforts concerning the current drought.

This program was selected because of its educational and ecological value, and because of the high percentage of yard and food waste in the City's residential sub-wastestream. Backyard composting will reduce the high volume of leafy yard waste and food waste in the residential wastestream. Leafy yard waste accounts for 22% of total residential waste. Food waste is 16.7% of the residential sub-wastestream. The City's goal is to have 500 residents of single-family homes begin backyard composting in the short-term period, and to have 2,000 residents participating in the program during the medium-term period.

1. Short-term Projected Diversion:

The materials that are diverted through backyard composting are leafy yard waste and food waste. A per household waste generation rate for leafy yard waste and food waste was calculated for single family residences in the City using the results of the waste characterization study and housing figures from the City's general plan. The generation rates were multiplied by typical composting percentages to estimate the annual tonnages of leafy yard waste and food waste that can be expected to be diverted from the residential sub-wastestream through backyard composting.

During the short-term period (1991-1995), the City expects 500 households to maintain a backyard composting system. Food waste diversion was calculated as follows:

$(0.30385 \text{ annual tons per household})(60\% \text{ composting rate})(500 \text{ households}) = 91.15 \text{ annual tons food waste diversion}$. This will result in diversion of 0.03% of the City's total wastestream.

Leafy yard waste diversion was calculated as follows:

$(0.40026 \text{ annual tons per household})(40\% \text{ composting rate})(500 \text{ households}) = 80.05 \text{ annual tons leafy yard waste diversion}$. This will result in diversion of 0.03% of the city's total wastestream.

2. Medium-term Projected Diversion

During the medium-term period (1996-2000), the City expects 2,000 households to participate in the backyard composting program. Food waste diversion was calculated as follows:

$(0.30385 \text{ annual tons per household})(60\% \text{ composting rate})(2,000 \text{ households}) = 364.60 \text{ annual tons food waste diversion}$. This will result in diversion of 0.14% of the city's wastestream.

Leafy yard waste diversion was calculated as follows:

$(0.40026 \text{ annual tons per household})(40\% \text{ composting rate})(2,000 \text{ households}) = 320.20 \text{ annual tons leafy yard waste diversion}$. This will result in a diversion of 0.12% of the city's total wastestream.

c. Consumer Education Program

Description:

This program will consist of two parts. The first is distribution of an environmental shopping guide. The second is development of school curriculum on recycling and source reduction.

1. Environmental Shopping Guide

The City will promote an "environmental shopper" or "precycle" campaign. This campaign will provide shoppers with guidelines for purchasing to reduce waste. A booklet will be distributed with information on many methods of "green" shopping such as:

- Choosing reusable, recyclable, durable items
- Always bringing canvas shopping bags and containers when shopping or eating out
- Purchasing products in reusable, recyclable, or reduced packaging

- Buying items in bulk whenever possible
- Declining to have items such as clothing and housewares placed in a disposable bag or container
- Looking for items made with recycled materials/packaging
- Writing or telephoning manufacturers to encourage them to use minimized packaging and recycled materials
- Buying easy-to-repair items
- Avoiding purchasing products from manufacturers with poor environmental practices.

The consumer education program will stress the following points:

- a. The City's commitment to waste reduction. Citizens must be made aware of the City's own activities such as procurement policies, two-sided copying, on-site composting, etc.
- b. That one person can make a difference. For example, the campaign may feature posters with a picture of the number of disposable cups that the average person would save in one year by bringing a coffee mug to work. Consumers are more motivated to change their behavior when they feel their actions can have an impact.

The consumer education program will also publicize local organizations that buy and sell used clothing and household items.

2. School Programs

The City will coordinate with schools to integrate waste reduction topics into school curricula. This will encourage environmental awareness at an early age, when children are very impressionable. The City will invite teachers from local schools to form a task force with the recycling staff to develop this program.

Justification:

Education is absolutely necessary to promote awareness of source reduction. There is a widespread lack of information on what constitutes source reduction. Most residents perceive that one person's actions have little or no impact on the quality of our environment. Education will both inform consumers and students about what they can do to alleviate the growing volume of waste, and will motivate them to change their purchasing and consumption habits by providing examples of the effects of individual behaviors on waste generation.

Projected Diversion

A per capita waste generation rate for City residents was calculated using the results of the City's waste characterization study. It is assumed that during the short-term period, the consumer education program will result in 10% of residents adopting source reduction behaviors (excluding backyard composting) such as purchasing modifications, using reusable or canvass shopping bags, buying more durable and repairable items, and donating used clothing and goods to charitable organizations. It is further assumed that source reduction behavior will result in a 10% per capita waste reduction.

1. Short-term Projected Diversion

Short-term diversion (1991-1995) was calculated as follows:

$(0.6377 \text{ tons per capita})(10\% \text{ participating residents})(10\% \text{ reduction})(92,191 \text{ residents}) = 587.86$ tons per year diversion through consumer education programs. This will result in a total wastestream diversion of 0.23%.

2. Medium-term Projected Diversion

In the medium term (1996-2000), it is assumed that the number of residents participating in source reduction activities (excluding backyard composting) will rise to 20%. The diversion rate was calculated as follows:

$(0.6377 \text{ tons per capita})(20\% \text{ participating residents})(10\% \text{ reduction})(92,191 \text{ residents}) = 1175.80$ tons per year diversion through consumer education programs. This will result in a diversion of 0.45% of the city's total wastestream.

d. Business Education Program

Description:

The City will develop promotional and educational materials that urge companies to do the following:

1. Adopt procurement policies that favor recycled, recyclable, reusable, and durable materials
2. Institute office source reduction programs including two-sided copying, electronic mail, reusable shipping containers, and bulk purchasing
3. Develop on-site composting programs
4. Offer rewards to individuals and departments for source reduction efforts
5. Purchase used and refurbished equipment and supplies whenever feasible.

6. Submit source reduction and recycling plans to the City with information on existing and planned programs, tonnages diverted, and assistance needed.

Justification:

Business education is just vital as consumer education to bring about progress in source reduction. Commercial and industrial waste accounts for 77.3% of the City's total wastestream. Education of business and industry will have a significant impact on waste generation. The City will encourage the private sector to move quickly to enact programs by publicizing the mandated AB 939 diversion goals and emphasizing that voluntary measures will be relied upon unless these diversion goals are not met. If voluntary measures are unsuccessful, the City may need to invoke its authority to mandate business source reduction activities.

Projected Diversion:

1. Short-term Projected Diversion

The City's commercial waste reduction survey was mailed to 1813 companies. Of these, 356 responded. One-hundred-thirty-five of the 356 respondents indicated that they had recently examined their operations for source reduction potential. Therefore, 135 of the 1813 companies surveyed (7.4%) indicated an awareness about source reduction issues. It is therefore assumed that 5% of Santa Clara's businesses engage in source reduction activities. It is projected that this percentage will increase to 9.7% through the business education program. It is further assumed that 5% of each business's waste is diverted through source reduction. Total diversion for the short-term was calculated as follows:

$(9.7\% \text{ participating businesses})(5\% \text{ waste reduction/business})(200,511 \text{ tons/year business waste}) = 973 \text{ tons per year business waste diversion.}$ This will result in diversion of 0.38% of the city's total wastestream.

2. Medium-term Projected Diversion

During the medium-term period, the business education program will result in 12% of Santa Clara's businesses engaging in source reduction activities. Total diversion was calculated as follows:

$(12\% \text{ participating businesses})(5\% \text{ waste reduction per business})(200,511 \text{ tons/year business waste}) = 1203 \text{ tons per year of business waste diversion.}$ This will result in diversion of 0.46% of the city's total wastestream.

e. Awards and Public Recognition Program Expansion

Description:

The City will expand promotion and publicity of its awards for commercial waste reduction and will offer engraved plaques to winning firms. The City will promote the awards program through the following measures:

- The program will be publicized through local media including newspapers, trade journals, and radio
- The City will investigate the feasibility of presenting the awards in a specially scheduled event. Currently, the awards are presented at a City Council meeting. A special event could lend more prestige to, and generate more interest in, the awards program.

Justification:

Public recognition of source reduction efforts is strongly motivating to business and industry. Waste reduction efforts can be costly for businesses. The main benefit for companies is to demonstrate environmental leadership to customers and improve product sales. Businesses also perceive a secondary benefit of waste reduction efforts which is to avoid future government regulations concerning solid waste management.

Projected Diversion

Diversion for this program has been included in the diversion rate calculated for the Business Education Program discussed above.

f. Evaluate Feasibility of Procurement Ordinance

Description:

The City will evaluate the feasibility of adopting a procurement ordinance giving a price preference to recycled, durable, reusable, and recycled materials. Currently the City does not have the funds available to specify a price preference for recycled and waste-minimizing products, which are almost always more expensive than products made out of virgin materials. The City will continue to purchase recycled materials whenever economically feasible. The City will actively pursue suppliers of reasonably priced, recycled materials.

Justification:

A procurement ordinance designed to reduce waste and consumption is a crucial element in any City source reduction program because it will have the most immediate impact on City office waste. Such an ordinance would also provide a model procurement policy for businesses and demonstrate the City's commitment to waste reduction.

Projected Diversion:

The projected diversion for this program will be quantified as part of the city's evaluation of the feasibility of this alternative.

g. Expand City Source Reduction Programs

Description:

The City will perform a waste evaluation at all City facilities to determine what additional source reduction opportunities exist. The City's current activities will be promoted and expanded to increase participation in the following activities:

1. Two-sided copying, routing reading materials, and use of scrap paper

The City currently owns 8 auto-duplex two-sided copiers. Whenever possible, the City will purchase auto-duplex copiers. The City will continue to encourage employees to make two-sided copies whenever feasible. The City will encourage employees to use discarded white paper that has printing on only one side as scrap paper. City departments will be encouraged to route reading materials whenever possible to avoid having multiple subscriptions to periodicals, newsletters and newspapers.

2. Mulching yard waste and xeriscaping(drought-resistant planting)

The City will increase the use of drought-resistant plants. The City will mulch yard waste in an effort to reduce the volume waste generated on City grounds.

Projected Diversion

1. Short-term Projected Diversion:

Source reduction of paper is estimated by assuming that each employee will save 1.5 reams of paper through the above-described activities. 1.5 reams of paper weighs 7.5 pounds. Therefore 0.75 tons per year of paper will be reduced. This will result in a total wastestream diversion of 0.0003%.

Source reduction of green waste is estimated by assuming a 7% reduction in green waste tonnages from City grounds and traffic medians. Total green waste from City grounds and medians will total approximately 2,964 tons per year. Therefore total reduction will be 207.48 tons per year. This will result in a total wastestream diversion of 0.08%.

2. Medium -term Projected Diversion

Source reduction of paper is anticipated to increase to 2.0 reams per employee during the medium-term period for a total reduction of 1.0 tons per year . This will result in a total wastestream diversion of 0.0004%.

Source reduction of green waste is anticipated to increase to 10% during the medium-term period for a total reduction of 296.5 tons per year. This will result in a total wastestream diversion of 0.11%.

h. Legislative Support

Description:

The City will devote staff time to monitoring state and federal legislation on source reduction and recycling. City staff will be sent to relevant local conferences. The City will explore on-line data services with legislative information, subscribing to legislative journals, and coordinating with other cities to share information. When appropriate, staff will develop reports to the City Manager and City Council on specific bills. Staff may recommend that the Council take an official position to support bills which will increase source reduction efforts.

Justification:

It is crucial that local solid waste officials keep abreast of state legislative developments in order to design local legislation that augments and enhances state legislation. By monitoring the state's legislative trends, the City will better be able to anticipate new regulations and design City programs accordingly.

Projected Diversion:

It is not possible to quantify the amount of waste which may be source reduced due to this program. The program should result in an increase in source reduction activities throughout the state.

i. Voluntary Submission of Waste Reduction Plans

Description

The City will ask for a voluntary submission of commercial source reduction and recycling plans from all businesses and organizations holding a City business license which have an office or site located within the City limits. The City will request a description of recycling and source reduction programs, procurement policies, and diversion estimates. The City will emphasize that these plans will be considered when selecting recipients for the commercial recycling awards.

Justification:

The City will request a voluntary submission of waste reduction plans for several reasons. First, the City does not have the necessary funds to implement and monitor a mandatory submission program. Second, the business community should be given the opportunity to take the initiative in designing and implementing waste reduction programs on their own before the City mandates these programs. If the selected waste reduction programs do not result in an increase in commercial source reduction activities, mandatory waste reduction planning will be reconsidered.

Projected Diversion:

The diversion rate for this program has been quantified as part of the Business Education Program discussed above.

3. End markets for diverted materials

All of the City's selected programs reduce waste at the source, and therefore, end markets for diverted materials are not applicable.

4. Proposed methods of handling and disposal

No methods for handling waste are necessary for any of the City's selected programs.

5. Facilities needed

No facilities are required for the City's source reduction programs except for composting demonstration sites. These will be placed at various locations on City grounds to be determined by the Public works department and the grounds managers.

6. Total projected diversion

Total projected diversion for the City's source reduction programs is presented in Table 1. Total diversion amounts to 0.75% of the City's total annual wastestream diversion in the short-term period, and 1.27% in the medium term period.

Table 1
City of Santa Clara Total Annual Projected Diversion
from Source Reduction Programs

<u>Program</u> ¹	<u>Short-term diversion</u> <u>(1991-1995)</u>		<u>Medium-term diversion</u> <u>(1996-2000)</u>	
	(tons)	(%)	(tons)	(%)
Backyard Composting	171	.06%	685	.25%
Consumer Education	588	.23%	1176	.45%
Business Education ²	973	.38%	1203	.46%
City Offices Expansion	207	.08%	297	.11%
	1839	0.75%	3361	1.27%

¹Diversion quantities were not calculated for the Legislative Support Program and the Evaluation of Quantity-based User Fees.

²Diversion for expansion of the Awards and Public Recognition Program and the Voluntary Submission of Waste Reduction Plans Program are included in the diversion projected for the Business Education Program.

D. Program Implementation

1. Implementation of Source Reduction Programs

The following section presents the implementation tasks for the City's selected source reduction programs. This section identifies the agency responsible for implementation, the implementation tasks, and the projected costs for each program. Table 2 summarizes the implementation tasks and schedule for the City's selected source reduction programs. The annual costs for all programs are summarized in Table 3.

a. Evaluate Feasibility of Quantity-Based User Fees

Overview: Collect and analyze information on variable can rates and weight-based systems, including their potential risks and benefits.

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: The cost for this program is included in the City's current budget.

Tasks:

1. Assess potential for illegal dumping and corresponding costs for clean-up
2. Examine other jurisdiction's variable can rates
3. Interview other jurisdictions regarding potential issues and problems
4. Complete cost/benefit analysis
5. Make recommendation to Director of Public Works

b. Residential Backyard Composting Program

Overview: Educate the public about backyard composting and promote the City's assistance programs

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: \$500

Tasks:

1. Design and produce informational and promotional materials
2. Train staff on composting
3. Set up demonstration sites

c. Consumer Education Program

Overview: Educate residents about waste reduction and motivate behavior change

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost:\$2,000

Tasks:

1. Form task force with teachers from local schools
2. Obtain catalogs of available curricular materials
3. Assemble "precycle guide" informational materials
4. Distribute educational materials in schools
5. Distribute "precycle guide" in the community

d. Business Education Program

Overview: Educate the business community about source reduction and motivate change

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost:\$2,000

Tasks:

1. Design and produce educational materials
2. Distribute materials to the business community

e. Awards and Public Recognition Program

Overview: Expand the number of firms competing for the City's award

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: \$500

Tasks:

1. Design and produce promotional materials
2. Formalize award evaluation criteria
3. Design award plaque
4. Evaluate feasibility of holding separate awards ceremony

f. Evaluate Feasibility of Procurement Ordinance

Overview: Evaluate markets for these materials to determine if they can be purchased within the City's budget. Increase use of recycled, recyclable, and durable products.

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: The cost for this program is included in the City's current budget

Tasks:

1. Research markets for reasonably-priced suppliers
2. Survey other cities which have implemented successful procurement policies
3. Research state allowance for price preferences
4. Make recommendation to City Council

g. Expand City Source Reduction Programs

Overview: Increase employee participation in source reduction activities in all City offices

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: \$250

Tasks:

1. Perform waste audit at all City facilities
2. Evaluate possible source reduction alternatives
3. Select alternatives for implementation
4. Prepare educational materials for employees
5. Distribute materials and hold employee workshops

h. Legislative Support

Overview: Track legislative developments and trends at the state and federal level.

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: The cost for this program is included in the City's current budget

Tasks:

1. Assign staff person to oversee program
2. Investigate feasibility of using on-line legislative tracking service and coordinating with other jurisdictions/organizations
3. Analyze proposed solid waste legislation
4. Prepare reports to the Director of Public Works/City Council when appropriate

i. Voluntary Submission of Waste Reduction Plans

Overview: Motivate the business community to submit source reduction and recycling plans to the City

Responsible Agency: City of Santa Clara Department of Public Works

Annual Program Cost: \$1,250

Tasks:

1. Design and produce announcement of request
2. Develop tracking system for plans submitted
3. Notify businesses and organizations of request
4. Receive, acknowledge, and review plans submitted
5. Enter relevant information into City database

Table 2
City of Santa Clara Source Reduction Program
Tasks and Completion Schedule

Program	Tasks	Start Date
Evaluate Feasibility of Quantity-based User Fees Evaluation	1. Assess potential for illegal dumping and cost for clean-up.	1995-96
	2. Examine other jurisdictions' variable can rates and weight-based systems.	1995-96
	3. Interview other jurisdictions re: potential problems/issues	1995-96
	4. Complete cost-benefit analysis.	1995-96
	5. Make recommendation to Director of Public Works	1995-96
Backyard Composting Program	1. Design and produce informational and promotional materials	1992-93
	2. Train staff on composting	1992-93
	3. Set up demonstration sites	1993-94
Consumer Education Program	1. Form task force with teachers from local schools	1993-94
	2. Obtain catalogs & examples of available curriculum materials	1993-94
	3. Design and produce educational task force materials	1993-94
	4. Develop precycle guide	1993-94
	5. Begin using materials in schools	1994-95
	6. Distribute guide to consumers	1994-95
Business Education Program	1. Design and produce educational materials	1992-93
	2. Distribute materials to businesses	1992-93
Expand Awards & Public Recognition Program	1. Design and produce promotional materials	1991-92
	2. Formalize award evaluation criteria	1991-92
	3. Design award plaque	1991-92
	4. Evaluate feasibility of holding separate awards ceremony	1992-93
Evaluate Feasibility of Procurement Ordinance	1. Research recycled materials market for reasonably-priced suppliers	1992-93
	2. Survey other cities that have implemented procurement policies	1992-93
	3. Research state law allowance for price preferences	1992-93
	4. Formulate City policy	1993-94
Expand City Source Reduction Program	1. Perform waste audit at City facilities	1991-92
	2. Evaluate possible source reduction activities	1992-93
	3. Select activities for implementation	1992-93
	4. Prepare educational/promotional materials	1992-93
	5. Distribute materials and hold employee workshop	1992-93
Legislative Support	1. Assign staff person to oversee program	1991-92
	2. Investigate feasibility of using on-line legislation tracking service through League of Cities or others	1992-93
	3. Analyze proposed bills	1992-93
	4. Prepare reports to Director of Public Works/City Council recommending City take official position on specific bills when applicable	1992-93

Voluntary Submission of Waste Reduction Plans	1. Design and produce announcement of request	1993-94
	2. Develop tracking system for plans submitted	1993-94
	3. Notify businesses of request	1993-94
	4. Receive, acknowledge and review plans submitted	1993-94
	5. Enter relevant information into City database	1993-94

Note: Unless noted tasks would be started in the first or second quarter and completed by the end of the fourth quarter of the fiscal year stated.

Table 3
City of Santa Clara Source Reduction Program Costs

Program	Annual Costs
Backyard Composting Promotion and Education	\$ 500
Business and Consumer Education Programs	4,000
Awards and Public Recognition	500
Expansion of City Offices Source Reduction Program	250
Request for Commercial Waste Reduction Plans	1250
Program Evaluations of Variable Can Rate	
Procurement Policy and Legislative Support	Included in normal assigned tasks
Total Program Costs	\$6,500

E. MONITORING AND EVALUATION

The City will establish a monitoring system to determine if source reduction goals are being achieved. An evaluation process will also be established to determine which programs are effective and which need to be modified.

1. Methodology for Monitoring Programs

A method to determine standardized diversion rates from year to year will be developed to monitor the impact of the source reduction programs. There are several factors that need to be incorporated into a monitoring system. The three key components of the monitoring system will be as follows:

- Annual waste characterization study
- Calculation of tonnages diverted from landfill by source reduction programs
- Surveys to determine level of participation in programs and amount of waste diverted by programs.

There are two methods which could be used to calculate the tons of waste diverted through the City's source reduction programs. The first method is a "top-down" approach in which the the tons landfilled, incinerated, recycled, and composted are summed, and any per capita decrease is assumed to be the result of source reduction activities. The California Integrated Waste Management Board is undecided as of May, 1991 whether to allow this method for an official

measurement of source reduction. "Top-down" estimates of waste diverted through source reduction may be inaccurate due to demographic changes such as population growth, a change in per capita waste generation, economic factors such as employment, manufacturing activity, and housing starts, and changes in the ratio of residential to commercial/industrial waste generators. However, this method will be a necessary component to the City's monitoring program because it will form a database of waste generation tonnages and trends. Over time, the City will develop a more accurate profile of waste generation activity, and will be better equipped to determine which programs are successful. The City will also be able to determine which programs are impacted by external or economic factors.

The second method of measuring source reduction is a "bottom-up" approach whereby each program is analyzed for an estimate of tons avoided, and the total tons are summed to quantify the result of all source reduction activities. This method is accurate for some programs and not others. For example, it is possible to estimate the tonnages avoided through the City's backyard composting program by tracking the number of bins distributed to residents, the tons collected through the City rubbish program, and through an annual survey of selected residents. The number of bins distributed and the survey results would provide an estimate of the number of households participating in the program. This estimate would be multiplied by a per capita green waste generation rate and percentage of waste composted to derive an estimate of green waste composted. This number would be cross-checked with the decrease in tonnages collected through the rubbish program.

The bottom-up method is not very useful in estimating the amount of waste diverted by programs such as education and awards. It is very difficult to estimate the quantity of waste source reduced by these programs. A better method of determining the success of these programs is the participation rate. For example, the City could estimate the number of firms submitted applications to receive a waste reduction award. The number of residents who are adopting source reduction shopping techniques could be estimated through a survey of businesses asking if consumers are bringing their own bags, buying in bulk, and buying more selected "green" products.

The City's source reduction programs will be monitored regularly for efficiency and success. The City will survey the commercial sector annually to determine the level of source reduction activities and the effectiveness of the selected programs. The City will continue to send a staff person to meetings of the Santa Clara County Manufacturing Group to assess interest and participation in source reduction activities. The City will survey selected residents to monitor the number of backyard composting programs and the effectiveness of the educational programs.

By cross-checking annual waste characterization data with landfill tonnages and survey results, the City will be able to determine the effectiveness of the source reduction programs.

a. Source Reduction Program Written Evaluation Criteria

Written criteria will be used to evaluate the effectiveness of each recycling program. It is expected that the criteria will evolve as program experience is obtained. The initial criteria are:

1. Is the program diverting the amount of tonnage expected within the time frame envisioned?
2. What is the level of participation in the program?
3. Is the program's cost averaging what was projected?
4. Is the program still the most cost-effective method of source reducing the targeted tonnage? (Based on net \$/ton figures.)
5. Is there still material in the wastestream which this program was designed to source reduce?

2. Administration of Monitoring Program

Monitoring and evaluation of the source reduction program will be part of an overall monitoring and evaluation program for all SRRE/HHWE activities. This will ensure a consistent level of quality, and a centralized system for handling reporting activity. Reviewers, such as city councils and the State, will be provided with uniform evaluations for all programs.

The Public Works Department staff will be responsible for all SRRE monitoring and evaluation activities. The cost for this work will be included as part of the overall budget for the Department of Public Works.

3. Contingency Measures

The following measures will be taken if the monitoring program indicates that the diversion goals are not being attained:

- a. The frequency of program review will be increased to provide better tracking capabilities.
- b. Operating efficiencies of the program(s) will be reviewed to insure they are at an optimal level (e.g., staffing levels, adequacy of promotional materials, level of commitment by private sector, etc.)
- c. All involved parties will be surveyed to determine if they have been educated as to their responsibilities.
- d. The feasibility of creating a financial system of incentives and penalties to increase diversion rates would be examined.

- e. An increase in public education efforts would be undertaken for both the residential and commercial generators.
- f. A review of the source reduction goals would be conducted to determine if maximum diversion had been achieved based on wastestream data.

Appendix III-A

City of Santa Clara

Memo to Employees on Two-sided Copying

RECEIVED
JUL 20 1990
STREET DEPT. CH
CITY OF SANTA CLARA

INTEROFFICE MEMORANDUM
CITY OF SANTA CLARA

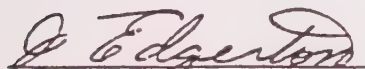
DATE: July 17, 1990
TO: All Departments
FROM: Purchasing Agent
SUBJECT: Paper Conservation

[] INFO ONLY
[] PLEASE REPLY
[] CONFIDENTIAL

To further our city-wide paper conservation program, you are requested to specify 2-sided printing on your print shop work orders whenever possible. This is obviously an easy way to cut paper consumption in half.

The same concept should be employed on photocopy machines, throughout the City, with the duplexing feature.

It is acknowledged that in some instances 2-sided printing is not appropriate, for various reasons. Therefore, common sense should be used in deciding the proper approach.



Jerry Edgerton
Purchasing Agent

Approved by:



Jennifer Sparacino
City Manager

JE:df

A:\memo\PaperCon.srv

Appendix III-B

City of Santa Clara

Purchasing Policy

RECEIVED

APR 20 1990

Office of the City Manager
City of Santa Clara

INTEROFFICE MEMORANDUM
CITY OF SANTA CLARA

DATE: April 19, 1990

TO: City Manager

FROM: Purchasing Agent

SUBJECT: Assignment No. 90-080

☐ INFO ONLY
☐ PLEASE REPLY
☐ CONFIDENTIAL

The only recycled paper product we buy, to my knowledge, are the utility bill envelopes. This does involve a large quantity - over a million envelopes a year.

Regarding janitorial papers, (toilet tissue, paper towels, seat covers), we have obtained them largely through the State Coop. Purchasing Program in recent years. While these products may contain recycled paper, it is not a requirement of the State specifications. In the past, State contract prices have been far better than we could obtain from local wholesalers, but under the current contract, it appears we can do just as well buying locally through our normal bidding procedures. We will aggressively pursue the recycled aspect of these items, but it is expected a premium would have to be paid.

Concerning printed forms purchased from outside vendors, such as the utility bill, they do not bid using recycled paper as this would raise their price. Also the problem of a marginal quality form arises, especially when run on high speed machines.

For printing paper used in the print shop and in City copiers, the same situation has existed for many years: Recycled paper does not feed properly, thus creating jams, gives off much more paper dust, and is more expensive. We are in weekly contact with paper suppliers and it seems there is a very gradual trend for the quality of recycled paper to go up and the price to come down. We will use it as soon as it is practical.

Another aspect of this matter is that paper recyclers prefer virgin paper. There is a limit to how many times the same material can be recycled. So, we could face a situation where recyclers would refuse our paper and we would have to dispose of it in the landfill; this of course would defeat the whole idea of recycling.

Appendix III-C

City of Santa Clara

**Annual Commercial Integrated
Waste Management Award Information**

Meeting Date: 5/14/91

Council ☒
Agency ☐
SOSA ☐

AGENDA REPORT

Agenda Item # 5C

City of Santa Clara, California



DATE: May 9, 1991

TO: City Manager for Council Action

FROM: Deputy DPW/Street Superintendent
Director of Public Works

APPROVED BY COUNCIL

Date: 5/14/91

SUBJECT: Commercial Integrated Waste Management Award

SUMMARY

A Commercial Waste Reduction and Recycling Survey was sent to businesses in Santa Clara as part of a study conducted to comply with the California Integrated Solid Waste Management Act of 1989. In reviewing the responses (350 returned of 1813 sent), it is evident that a number of companies have made outstanding efforts to reduce the quantity of solid waste sent to landfill.

To reward their efforts and encourage other businesses to follow their example, staff recommends the establishment of an annual Commercial Integrated Solid Waste Management Award. Awards would be presented in 3 categories: large companies, mid-sized companies, and small companies.

RECOMMENDATION

It is recommended that the City Council:

- 1) Authorize the creation of an annual Commercial Integrated Solid Waste Management Program recognizing outstanding commitment to reducing solid waste in the business community.
- 2) Set a Special Order of Business on May 21, 1991, which coincides with National Public Works Week, for presentation of the first annual awards to National Semiconductor, Siliconix, Science Applications International Corporation, and Delectables Catering.
- 3) Approve the issuance of certificates placed in City folders for all awards.

Richard J. Mauck
Deputy DPW/Street Superintendent

Robert R. Mortenson
Director of Public Works

Approved:

Jennifer Sparacino
City Manager

DISCUSSION

In 1989, the California legislature mandated that cities and counties within the State reduce the amount of solid waste going to landfill 25 percent by the year 1995 and 50 percent by 2000.

In Santa Clara, the commercial sector generates over 70 percent of all solid waste sent to landfill. To gauge the waste reduction efforts already being made by businesses in the City, employers were asked to complete a survey quantifying annual results of voluntary recycling and source reduction programs. A total of 350 responses to 1813 surveys were received.

Results of the survey indicate a number of companies are making concerted efforts to reduce solid waste. The companies that responded to the survey divert an estimated 13,939 tons of material each year.

Public Works staff has reviewed the completed surveys using the following criteria:

1. Program Comprehensiveness
2. Source Reduction Efforts
3. Commitment
4. Program promotion
5. Effectiveness of Efforts

In three categories:

1. Large companies (500 or more employees)
2. Mid-sized companies (75-500 employees)
3. Small companies (less than 75 employees)

Of the large companies responding, Siliconix and National Semiconductor showed exceptional results. With 900 employees, Siliconix diverts 72 percent of their solid waste. The proceeds from the sale of collected materials is used to fund two to three employee events per year, providing an incentive for employees to recycle. The company also benefits from reduced disposal costs.

National Semiconductor's recycling program was started as a way to cut costs. The program does not rely as heavily on employee participation as the Siliconix program. Instead, materials are collected mixed by National Semiconductor's custodial staff and sorted later by their recycling contractors.

Commercial Awards

May 9, 1991

page three

Science Applications International Corp., the mid-sized company candidate, has a program to collect aluminum cans, glass, high-grade paper, and newspaper. Employees rotate recycling duty and the aluminum cans are donated to a local troop of Girl Scouts.

The small company award candidate has an aggressive internal collection program for aluminum cans, glass, corrugated cardboard and plastics. Delectables Catering employs eight people to cater corporate functions. They plan to offer recycling services to clients in the near future and they are developing a newsletter which will include information on recycling.

Copies of the Commercial Waste Reduction and Recycling Surveys completed by the recommended award winners have been placed in Council offices for review.

Appendix III-D

City of Santa Clara

Commercial Waste Reduction and Recycling Survey

CITY OF SANTA CLARA
COMMERCIAL WASTE REDUCTION AND RECYCLING SURVEY

Company Name: _____

Date: _____

1. The person to contact concerning the contents of this survey:

Name/Title _____

Address _____

Phone No. _____ Hours to contact _____

No. of employees in Santa Clara _____

2. Do you currently recycle any portion of your solid wastes?
[] Yes [] No [] Proposed

3. How long has your program been in operation? _____ (yrs./mos.)

4. Please indicate who does your recycling:

[] Employees [] Refuse Hauler [] Scavenger [] Other

Name of recycler _____

5. Our business currently recycles:

Estimated Annual Quantity Recycled
or Reduced (by weight)

7-1-89 to 6-30-90

(Note if period is different)

[] Aluminum Cans	_____
[] Glass	_____
[] Computer paper	_____
[] White office paper	_____
[] Corrugated cardboard	_____
[] Newspaper	_____
[] Precious metals	_____
[] Scrap metals	_____
[] Plastics	_____
[] Wood (incl.pallets)	_____
[] Appliances/equipment	_____
[] Furniture	_____
[] _____	_____
[] _____	_____

Total

(Include all materials that would normally be discarded that were instead repaired, donated or recycled. Include disposable items for which a reusable substitute has been found.)

6. Does your company include recycled materials in the manufacture of your product?
☐ Yes ☐ No ☐ Not applicable
If yes, explain _____
-
7. Does your company purchase supplies (office, janitorial, etc.) made from recycled materials?
☐ Yes ☐ No
8. Have you recently examined your operations to see if there are ways you can reduce the amount of materials you use in manufacturing, packaging, printing or other operations?
☐ Yes ☐ No
9. Would you like public recognition of your efforts?
☐ Yes ☐ No
10. Would you be interested in a solid waste audit of your facility to help identify ways you can minimize your waste stream and reduce your garbage collection bills?
☐ Yes ☐ No
11. Please include any reports, brochures, etc. that describe your business and solid waste practices.
☐ See enclosures
12. Comments:

Return by September 15, 1990 to:

Richard J. Mauck
Deputy DPW/Street Superintendent
City of Santa Clara
1500 Warburton Avenue
Santa Clara, CA 95050
(408) 984-3151

Appendix III-E

Evaluation of Source Reduction Program Alternatives

Appendix III-E
Evaluation of Source Reduction Program Alternatives

	Disposal Fee Modification	Quantity-based User Fees	Weight-based Fee System	Loans, Grants, Loan Guarantees	Deposits, Refunds and Rebates	Reduced Business License Fees
Reduces quantities of solid waste disposal	3	3	5	3	3	1
Hazard Created	4	4	4	5	5	5
Accommodates Changing Conditions	3	5	5	5	3	5
Merely shifts waste type created	5	5	5	5	4	5
Implementable in short/medium-term planning periods	3	4	3	5	3	5
Requires new/expanded Facilities	5	5	4	5	5	5
Consistent with local plans and ordinances.	2	3	4	2	3	3
Institutional Barriers	2	3	3	2	2	2
Estimated Cost	4	3	2	2	4	3
Total Score	31	35	35	34	32	34

Appendix III-E
Evaluation of Source Reduction Program Alternatives

	Waste Evaluations	On-site Composting Assistance	Residential Backyard Compositing	Technical Assistance	Educational Efforts	Awards/ Recognition
Reduces quantities of solid waste disposal	3	3	3	3	4	2
Hazard Created	5	5	5	5	5	5
Accommodates Changing Conditions	5	5	5	5	5	5
Merely shifts waste type created	5	5	5	5	5	5
Implementable in short/ medium-term planning periods	5	5	5	5	5	5
Requires new/expanded Facilities	5	4	4	5	5	5
Consistent with local plans and ordinances.	2	3	5	2	5	5
Institutional Barriers	2	2	3	3	5	5
Estimated Cost	2	2	4	1	3	4
Total Score	34	34	39	34	42	41

Appendix III-E
Evaluation of Source Reduction Program Alternatives

	Procurement Ordinances	Land-Use Incentives	Waste Reduction Plans	Bans on Product Packaging	Legislative Support	Source Reduction at City Offices
Reduces quantities of solid waste disposal	4	2	3	3	2	3
Hazard Created	5	5	5	5	5	5
Accommodates Changing Conditions	5	4	5	2	5	5
Merely shifts waste type created	5	5	5	2	5	5
Implementable in short/medium-term planning periods	5	4	5	5	5	5
Requires new/expanded Facilities	5	5	5	5	5	5
Consistent with local plans and ordinances.	3	3	4	1	5	5
Institutional Barriers	2	3	3	2	5	5
Estimated Cost	3	3	3	3	5	4
Total Score	37	34	38	28	42	42

Appendix III-F

Utility Bill Insert on

Reduce, Reuse, Recycle

DPW

Meeting Date: 5-28-91

Council ☒

Agency ☐

SOSA ☐

AGENDA REPORT

City of Santa Clara, California

Agenda Item # 6.B



DATE: May 23, 1991

TO: City Manager for Council Action

FROM: Director of Public Works

SUBJECT: Utility Bill Insert per Council Direction / Modifications to
"Reduce, Reuse, Recycle" Information

SUMMARY

Council has requested a revision of the utility bill insert regarding source reduction and recycling for the June billing cycle.

Staff has deleted information regarding milk containers and salon products and has replaced it with information regarding reuse through donations to thrift shops.

A draft of the contents has been placed in Council offices for review. The final document will be typeset to make the wording more legible.

RECOMMENDATION

It is recommended that Council:

Approve the contents of the utility bill insert for June 1991, concerning source reduction and reuse.

Richard J. Mauck
Deputy DPW/Street Superintendent

Robert R. Mortenson
Director of Public Works

APPROVED:

Jennifer Sparacino
City Manager

APPROVED BY COUNCIL

Date: 5/28/91

REDUCE, REUSE, RECYCLE

6.B

Recycling is an important part of any solid waste management program, but by "precycling" - or reducing at the source - and reusing material, we can prevent the creation of waste in the first place. To practice precycling and reuse, ask these questions before acquiring an item: Can I do without it? If not, is it packaged in the least amount of material possible? Is it (and its packaging) reusable or recyclable? By using these suggested means of precycling and reuse, and creating others at home and at work, we can work together to ensure a healthy environment.

AT HOME

- * Reduce waste by buying in bulk and avoiding excess packaging.
- * Purchase items that are durable, not single-use items.
- * Remove yourself and your family from junk mail lists.
Write:

Mail Preference Service
c/o Direct Marketing Association
11 West 42nd St.
P.O. Box 3861
New York, N.Y. 10163-3861

This does not remove you from lists you are already on, but prevents you from being added to new ones.

- * When grocery shopping, use the paper or plastic bags from your last trip. Or, purchase reusable canvas or mesh bags and don't use paper or plastic bags at all.
- * When shopping, if you are only purchasing a few items, save a bag by telling the clerk that you don't need one.
- * Request that oil and lube shops recycle used motor oil.
- * Donate items you no longer need to second-hand stores or thrift shops.

IN THE OFFICE

* Print copies on both sides of the paper. This reduces paper waste and saves on the cost of paper.

* Use a coffee mug instead of disposable polystyrene or paper cups.

* Use electronic mail for company announcements and memos.

* Avoid using a fax machine unless necessary. At this time, most fax paper is not recyclable. Instead of a cover sheet, use a post-it designed for faxes on page one.

* Avoid making photocopies. Pass around the original instead of making a copy for each reader.

* Use the computer printer only when necessary. Instead, look at the document while it's on the screen to edit and review.

* Usable items such as office furniture, appliances and other equipment may be of use to organizations like Goodwill Industries or the Salvation Army.

* Use the blank side of paper for notes and scratch paper.

* Circulate magazines rather than buying multiple subscriptions.

* Use refillable pens and pencils.

**BY REUSING, REDUCING AND RECYCLING,
WE CAN ALL MAKE A DIFFERENCE!**

For further information or assistance, call the City of Santa Clara recycling office at 984-5188.

Introduction

Recycling is the third priority in the AB 939 waste reduction hierarchy after reduction and reuse. Recycling can generate revenues from material sales, promotes public environmental consciousness, and diverts materials from the landfill that cannot be removed from the waste stream by the City's source reduction and reuse programs.

Recycling involves a set of activities in which waste materials are collected, processed, marketed, and remanufactured into new products. Each of these activities is an integral link in the recycling system. All of the parts of the system are interdependent. No one of these activities, by itself, constitutes recycling. In addition to the collection, processing, and marketing of materials, other activities are also vital to the success of recycling programs. Education and public information programs create awareness and stimulate participation. It is also important that waste generators, including residents, businesses, institutions and the City, purchase products made from recycled materials in order to complete the recycling loop.

The main goal of the Recycling Component is to develop a comprehensive recycling program for the City of Santa Clara. This program will include the residential, commercial, industrial, and institutional sectors of the City. For purposes of the following discussion, recycling by the commercial, industrial, and institutional sectors will often be referred to collectively as "commercial recycling". The City's program objectives are designed to meet the short and medium-term waste diversion goals set forth by the State of California through AB 939 and subsequent legislation.

A. OBJECTIVES

1. Short-term Objectives (1991-1995)

a. General Objectives

The City's recycling program goals for the short-term period are as follows:

1. Expand the curbside recycling program to include all multi-family dwellings.
2. Add cardboard, HDPE plastic, and magazines to the curbside programs.
3. Encourage the expansion of existing commercial recycling programs and promote the development of new programs.
4. Evaluate the feasibility of including plastics other than PET and HDPE in the City's curbside program.
5. Increase the recycling rates in the City offices recycling programs.
6. Expand the public education campaign.

b. Market Development Objectives

The City's market development objectives for the short-term period are as follows:

1. Evaluate the feasibility of adopting a procurement policy that requires the purchase of recycled materials.
2. Support legislation that requires a minimum recycled material content for products and that promotes the use of recycled materials on the county, state and federal levels.
3. Work through the TAC Source Reduction/Recycling Subcommittee to obtain current information on existing and new markets for recycled materials.

2. Medium-term Objectives (1996-2000)

a. General Objectives

The City's recycling program goals for the medium-term period are as follows:

1. Evaluate the feasibility of adding mixed and high-grade paper to the curbside program.
2. Expand recycling by self-hauled waste sources.
3. Expand the consumer and business education programs.
4. Evaluate the feasibility of a more progressive quantity-based user fee system.

b. Market Development Objectives

1. Continue market development activities initiated in the short-term period.
2. Evaluate the feasibility of revising local planning and zoning codes to encourage the location of manufacturers which use recycled materials in the City of Santa Clara.

3. Targeted Materials

The waste characterization study performed for the City of Santa Clara indicates that the City's wastestream contains recyclable materials in sufficient quantities to be targeted for diversion in the City's recycling programs.

The City used the following criteria to identify the materials targeted for diversion:

- a. Volume of the material
- b. Weight of the material
- c. Hazard of the material
- d. Whether the material is made of non-renewable resources
- e. Recovery potential for the material
- f. Availability of local markets for the material

a. Targeted Materials in the Residential Recycling Programs

The City will target the following materials in its residential recycling programs:

Newspaper	Newspaper is 7% of the residential subwastestream by weight. It also accounts for 11% of the multi-family subwastestream. Local markets for newspaper are readily available.
Mixed Paper	Mixed paper (magazines, dry-food packaging, mail, paper bags) makes up the largest percentage of the residential subwastestream by weight, 14% of the total. Mixed paper is also 16% of the multi-family subwastestream
High-Grade Paper	High-grade paper, such as ledger and computer papers, make up a small percentage of the residential and multi-family subwastestreams, slightly more than 1% by weight. However, there are very strong local markets available for high grade paper.
Cardboard	Cardboard accounts for 4% of the residential subwastestream and 8% of the multi-family subwastestream. It is an easily recoverable material and there are local markets available for cardboard.
Glass	Glass, consisting of food and beverage containers, makes up about 1% of the residential subwastestream by weight. However, glass is a large percentage of the multi-family subwastestream, 8% by weight. There are local markets available for glass, provided it is color sorted.
PET	PET, consisting largely of the two liter plastic beverage containers, makes up a small percentage of both the residential and multi-family subwastestreams, less than 1% by weight. However, there are local markets available for this material which is made from a non-renewable resource.

Aluminum Aluminum, consisting largely of aluminum beverage containers, is a very small percentage of the residential and multi-family subwastestreams by weight. However, given strong demand from excellent local markets, it has a very high recovery potential.

b. Targeted Materials in the Commercial Recycling Programs

The City will target the following materials in its commercial and industrial recycling programs:

Newspaper Newspaper makes up 3% of the commercial subwastestream and 2% of the industrial subwastestream. It is an easily recoverable material and there are excellent markets available in the region.

Mixed Paper Mixed paper makes up 11% of the commercial subwastestream and 6% of the industrial subwastestream.

High-Grade Paper High-grade paper makes up 5% of the commercial subwastestream and 3% of the industrial subwastestream. This material also has excellent local markets.

Cardboard Cardboard is a large percentage of both the commercial subwastestream and the industrial subwastestream, 16% and 17% respectively.

Aluminum Aluminum is an easily recoverable material and there are excellent local markets available for this material. This material is 0.1% of the commercial subwastestream and 0.2% of the industrial subwastestream.

Glass	Glass is made from a non-renewable resource. There are local markets available for this material. It accounts for 3% of the commercial subwastestream and 1% of the industrial subwastestream.
PET	PET is made from a non-renewable resource and there are local markets available for this material. The commercial subwastestream is 0.2% PET. There is no PET in the industrial subwastestream.
HDPE	HDPE, consisting largely of plastic milk jugs, is made from a non-renewable resource and there are local markets available. This material is 1% of the commercial subwastestream and 2% of the industrial subwastestream.
Polystyrene	Polystyrene is made from a non-renewable resource and accounts for 0.4% and 0.5% of the commercial and industrial subwastestreams.
Wood	Wood comprises a large percentage of the industrial subwastestream (16%) and there are local markets available for this material. Chipped wood is used for landscaping and as boiler fuel for industry. Wood waste is 3% of the commercial subwastestream.

B. EXISTING CONDITIONS DESCRIPTION

The following section contains a description of the current recycling activities in the City of Santa Clara. The program descriptions include information on the amount of material currently being recovered by weight and percentage of the overall wastestream. The City recently surveyed the business community to obtain information on existing commercial and industrial recycling activities.

1. Description of Existing Recycling Programs

There are several public and private recycling programs currently operating within the City of Santa Clara. A summary of existing

recycling programs and their 1990 diversion quantities is presented in Table 1. A total of 38,419 tons were recycled by these programs in 1990, resulting in a diversion rate of 13.8% of the total wastestream.

Table 1

CITY OF SANTA CLARA: 1990 DIVERSION

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

MATERIAL		residential curbside	multi-family curbside	city offices	composting	buyback and 20/20	drop off	commercial on-site	landfill salvaging	richard ave	newby	zanker	TOTAL DIVERTED	TONS LANDFILLED	TOTAL MSW	DIVERSION PERCENTAGE
PAPER	OCC	0.00	0.00	0.00	0.00	0.00	0.00	3,693.00	583.92	0.00	0.00	0.00	4,276.92	33,406.55	37,683.47	11.35%
	MIXED PAPER	0.00	0.00	0.00	0.00	0.00	0.00	174.40	0.00	0.00	0.00	0.00	174.40	23,861.82	24,036.22	0.73%
	NEWSPAPER	2,108.00	0.00	0.00	0.00	0.00	196.60	270.00	0.00	0.00	0.00	0.00	2,574.60	9,067.49	11,642.09	22.11%
	HIGH GRADE	0.00	0.00	18.00	0.00	0.00	0.00	2,442.80	0.00	0.00	0.00	0.00	2,460.80	7,874.40	10,335.20	23.81%
	OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00	40.00	15,510.18	15,550.18	0.26%
PLASTICS	HDPE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,579.27	3,579.27	0.00%
	PET	19.00	0.00	0.00	0.00	5.60	1.00	33.00	2.53	0.00	0.00	0.00	61.13	238.62	299.75	20.39%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	38.30	0.00	0.00	0.00	0.00	38.30	11,215.06	11,253.36	0.34%
GLASS	CAL REDEMPTION	531.60	0.00	0.00	0.00	246.00	11.00	480.00	31.08	0.00	0.00	0.00	1,299.68	2,624.80	3,924.48	33.12%
	REFILLABLE	0.00	0.00	0.00	0.00	0.00	0.00	16.80	0.00	0.00	0.00	0.00	16.80	1,193.09	1,209.89	1.39%
	OTHER RECYCLABLE GLASS	354.60	0.00	0.00	0.00	2.00	0.00	160.00	0.00	0.00	0.00	0.00	516.60	1,908.95	2,425.55	21.30%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.62	238.62	0.00%
METALS	ALUMINUM CANS	33.00	0.00	0.00	0.00	211.00	1.00	31.00	109.97	0.00	0.00	0.00	385.97	477.24	863.21	44.71%
	TIN CANS	90.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	1,431.71	1,521.71	5.91%
	FERROUS	0.00	0.00	63.00	0.00	0.00	0.00	2,518.60	311.90	0.00	0.00	0.00	2,893.50	8,590.26	11,483.76	25.20%
	NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	38.50	0.00	0.00	0.00	0.00	38.50	477.24	515.74	7.47%
	BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.86	23.86	0.00%
GREEN WASTE	GREEN WASTE/COMPOST	68.00	0.00	0.00	0.00	0.00	0.00	258.00	0.00	0.00	0.00	0.00	326.00	26,486.62	26,812.62	1.22%
OTHER ORGANICS	FOOD	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	20.00	21,952.88	21,972.88	0.09%
	WOOD	0.00	0.00	0.00	0.00	0.00	0.00	4,802.60	0.00	0.00	0.00	0.00	4,802.60	18,134.99	22,937.59	20.94%
	TEXTILES/LTHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,193.09	1,193.09	0.00%
	TIRPS/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	16.00	0.00	0.00	0.00	0.00	16.00	6,442.69	6,458.69	0.25%
	AG. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.62	238.62	0.00%
OTHER COMPACTED WASTES	WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	172.00	0.00	0.00	0.00	0.00	172.00	1,193.09	1,365.09	12.60%
	DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,670.33	1,670.33	0.00%
	HHW *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,533.75	4,533.75	0.00%
	OTHER	0.00	0.00	3.62	0.00	0.00	0.00	13.10	0.00	0.00	0.00	0.00	16.72	27,441.10	27,457.82	0.06%
UNCOMPACTED	INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,199.00	0.00	0.00	0.00	18,199.00	9,054.69	27,253.69	66.78%
TOTALS		3,204.20	0.00	84.62	0.00	464.60	209.60	15,218.10	19,238.40	0.00	0.00	0.00	38,419.52	240,061.00	278,480.52	13.80%

* HHW does not include motor oil, battery, and misc. HHW diversion of 416.78 tons in Total Diverted and Total MSW.

a. *City Recycling Programs and Policies*

1. City Offices Recycling Program

City employees recycle high-grade paper, computer paper, colored ledger paper, scrap metal, and automotive batteries through office recycling programs. Participation is voluntary. Employees store office paper in desktop containers and eventually empty these containers into larger centrally located bins. Paper is then aggregated by the janitorial staff and picked up on a regular basis by a local materials broker. Scrap metal, oil, and automotive batteries are collected at the City's garage and recycled. Revenues from material sales go to the City's general fund. Automotive batteries and oil are not included in the diversion amount.

This program diverted a total of 99 tons of material in 1990 (not including 15 tons of motor oil and batteries).

2. Landfill Scavenging Program

The All Purpose Landfill Company and Santa Clara Recycling, Inc., respectively operate a scavenging program and a buyback program at the All Purpose Landfill under a contract with the City of Santa Clara. Materials diverted include aluminum, scrap metal, glass, cardboard, newspaper, plastic, wood, and inert solids. The Landfill employs seven scavengers to operate the scavenging program.

This program diverted a total of 19,238 tons of material in 1990.

3. Economic Incentives

The City reduces the franchise fee it charges refuse haulers in the industrial zoned areas of the city by 3% if the haulers offer recycling services to customers or dispose of refuse at facilities which recycle more than 10% of the refuse delivered. There are also other ways for haulers to qualify for the fee reduction. A copy of the franchise fee policy is included in Appendix IV-A.

b. Residential Recycling Programs

1. Residential Curbside Collection Program

Since January, 1990, the City has offered weekly curbside collection to all single-family residences. Materials collected include newspaper, glass, aluminum, tin, PET and motor oil. Residents are provided with two five-gallon plastic buckets. They place aluminum and tin in one bucket and glass and PET in the other bucket. Newspaper is bundled separately or placed in kraft paper bags. Collection is on the same day as rubbish collection. The curbside program is operated by Santa Clara Recycling, Inc., a subsidiary of Mission Trail Waste Systems. The City's Department of Public Works assists in the development of promotional and educational materials for the curbside program in conjunction with Santa Clara Recycling, Inc. The program is regularly publicized by using the City's utility bill newsletter sent to all residents.

In 1990, a total of 3204 tons of materials were collected through the curbside program (not including 71.0 tons of used motor oil).

2. Multi-family Recycling Program

Since February, 1991, the City has been conducting a multi-family recycling pilot program using grant funds from the California State Department of Conservation. The pilot program provides weekly collection of aluminum, tin, glass, and newspaper to four multi-family buildings. Flyers were sent to residents of these four dwellings, and containers were distributed to those who requested them.

Since the program's inception, approximately 12 tons of materials have been collected.

3. Buy-back Centers and 20/20 Recycling Centers

There are six buy-back centers and 20/20 recycling centers in the City of Santa Clara where residents can sell PET, glass, and aluminum. A list of the City's buy-back centers is presented in Table 2.

These centers recycled a total of 464 tons of materials in 1990.

Table 2
City of Santa Clara
Buyback and Drop-off Centers

Name/City	Address/Telephone	AL	GL	PET	HG	LG	Mag	CB	Scrap Metals	Batteries	Oil	Other	Buyback/ Drop-off
ABC Recycling Industries Santa Clara	1015 Martin Avenue (408) 732-9253	◆	◆	◆	◆	◆		◆	◆	◆		Newspaper	Buyback
Container Corp. of America Santa Clara	2600 De La Cruz Boulevard (408) 732-9253				◆		◆					Newspaper	Buyback
C.A.T.S Santa Clara	545 Aido Avenue, #24 (408) 970-9515											Toner Cartridge	Dropoff
Reynolds Recycling Trailer Santa Clara	Homestead Shopping Center (800) 228-2525	◆	◆	◆									Buyback
Salvation Army Santa Clara	1494 Halford Avenue (408) 249-1715											Used Items	Drop-off
Santa Clara Recycling Center Santa Clara	5500 Lafayette (408) 727-3044	◆	◆	◆								Tin Cans, Newspaper	Buyback

4. Drop-off Centers and Non-Profit Recycling Activities

The Container Corporation of America accepts newspaper and magazines at a drop-off location in the city. Goodwill Industries also has two drop-off locations in the city for used household and clothing items.

In addition, the City participates in annual phone book recycling drives sponsored by Pacific Bell. Collection bins are placed at four Lucky stores in Santa Clara for residents and businesses to drop off their old phone books. Mission Trail monitors and empties the bins. The collected material is then taken to the Newby Island Recyclery.

These programs recycled a total of 210 tons of materials in 1990 (not including 76 tons of used motor oil).

5. Quantity-Based User Fee System

The City charges a flat per can rate-based garbage rate for residential garbage service. The charge for the first 32 gallon can is \$4.82 per month. The charge for the second and additional cans is \$4.72 per month. The City also offers unlimited weekly rubbish collection for a fee of \$.45 per household per month. Residents may place an unlimited quantity of yard waste, newspaper, and cardboard at the curb for pick-up by the rubbish collection program. The City has plans to modify the existing rubbish collection program to add a biweekly yard-waste-only collection element to the program. The yard waste will be delivered to a composting facility for processing. At the time of modifying the rubbish program to add yard-waste-only collection days, residents will be encouraged to recycle their newspaper and cardboard in the curbside collection program. (A full description of this collection program for yard waste is presented in Chapter V, Composting Component.)

c. Commercial Recycling Programs

1. City of Santa Clara Commercial Recycling Survey

In 1990, the City conducted an extensive commercial recycling survey. The City sent a questionnaire to 1,813 businesses operating in Santa Clara requesting information on company recycling efforts. Companies with 100 or more employees that did not respond to the survey were contacted by phone. Companies with large recycling estimates were

contacted to ensure that they did not include recycling tonnages for company locations outside the City. The 356 companies that responded recycled a total of 14,605 tons of material in 1990. The City plans to mail the survey annually to monitor private commercial recycling efforts.

A copy of the survey is presented in Appendix III-D.

2. Santa Clara County Manufacturing Group

The Santa Clara County Manufacturing Group is a trade association with over 100 member companies. The Group promotes awareness of current issues facing the manufacturing industry, including waste reduction issues. The Group has a committee on waste reduction/recycling, and has published a comprehensive waste reduction guide with information on source reduction, recycling, composting, and recycling companies and consultants. The guide is updated periodically, and is available to member companies free. Other interested companies may purchase the guide for \$20.

City staff works closely with the Group and assists with conferences, meetings, and public relations.

d. Materials Recovery Facilities

1. Newby Island Recyclery

The Newby Island Recyclery located at 1601 Dixon Landing Road in Milpitas is a materials recovery facility using a combination of mechanized and manual sorting processes. The facility, owned and operated by Browning-Ferris Industries, opened for business in 1991. Currently, the Recyclery processes about 300 tons of dry commercial and industrial waste on a daily basis. The facility also offers guided tours and houses an educational center open to the public.

The City sent 49,227 tons of commercial and industrial waste to Newby Island in 1990. Most of this material was landfilled at Newby Island, but the Recyclery is currently in the process of diverting the City's waste to its recycling operation. By 1995 all of the City's commercial and industrial waste that goes to Newby Island will be diverted to the Recyclery for processing.

2. Zanker Road Resource Recovery Facility

The Zanker Road Resource Recovery Facility has been operating for six years. The facility has a yard waste composting operation, demolition debris recovery, wood waste recovery operation, curbside sorting, mixed recycling, processing, and debris box service. The facility is owned by Norcal Waste Systems and is operated by Zanker Road Resource Management. The resource recovery facility, located at 705 Los Esteros Road in San Jose, offers guided tours to businesses, schools, and industry. Currently the facility processes approximately 60 tons of commercial, industrial, and demolition wastes per day with a diversion rate of 34%.

3. Richard Avenue Recycling Facility

Mission Trail, the City's principal hauler, is building a recycling processing facility on Richard Avenue in Santa Clara. The facility, expected to be completed by June 1992, will process recyclables collected from commercial and industrial businesses as well as materials collected from the curbside recycling program. Materials targeted for recovery include paper, plastic, glass, wood, and metals. The facility will also house a buy-back center where residents can sell their recyclables. The facility is expected to divert 265 tons per day of solid waste from the landfill. It is estimated the facility will achieve a recovery rate of at least 60% of the material it processes with an overall diversion rate of over 30%. The center will be open from 8:00 a.m. to 5:00 p.m. daily.

4. Guadalupe Mines Landfill

Guadalupe Mines landfill processes wood wastes and yard wastes. This facility would be used as a contingency if the other facilities couldn't handle the volume of wood and yard waste to be processed.

C. EVALUATION OF ALTERNATIVES

This section identifies and evaluates potential recycling programs for the City of Santa Clara. This section is divided into three parts: residential recycling alternatives, commercial recycling alternatives, and system-wide recycling alternatives which recycle both residential and commercial waste.

Each alternative is evaluated according to the following criteria as required by AB 939 regulations:

- a. Effectiveness of the alternative in reducing solid waste volume, weight, or percentage.
- b. Hazard created by the alternative.
- c. Ability to accommodate changing economic, technological, and social conditions.
- d. Consequences of the diversion alternative on the characterized waste. Will it merely shift one type of solid waste to another (i.e., switching from styrofoam coffee cups to paper coffee cups)?
- e. Can the alternative be implemented in the short and medium-term planning periods?
- f. Is there a need to expand existing facilities or build new facilities to support implementation of the alternative?
- g. Consistency of the alternative with applicable local policies, plans, and ordinances.
- h. Institutional barriers to local implementation of each alternative.
- i. Estimated cost of implementing the alternative.
- j. Availability of local, regional, state, national, and international end uses for the material which would be diverted through implementation of the alternative.

An evaluation matrix for each alternative has been prepared. Points were assigned for each evaluation criterion on a scale of 1 - 5. A low number of points means the alternative scores poorly on the listed criterion. A large number of points indicates it scores high on that

criterion. For example, a program to collect additional materials in the curbside recycling program could be fairly inexpensive to implement so it receives a high score in the Cost of Program category. However, it would divert only a small amount of material from the wastestream, so it receives a lower score for the amount of Material to be Diverted. If a criterion is not applicable to the alternative, it receives a high score to make scoring categories for all criteria consistent. The number of points assigned for each criterion depends upon how effective and feasible the alternative is for the specific conditions in the City of Santa Clara.

Programs with a score of 43 points or higher were selected for implementation. Programs with a score of 40-42 points were selected for further evaluation. Programs with less than 40 points were not selected.

The evaluation matrices for the City's alternative recycling programs are presented in Appendix IV-B.

1. Identification and Evaluation of Alternative Residential Recycling Programs

This section identifies and evaluates potential residential recycling programs needed to achieve the City's recycling objectives.

a. Collect Additional Material in Curbside Recycling Program

The recent introduction of the curbside recycling program in the City has been met with much enthusiasm by local residents. It is currently diverting 3,275 tons (including used motor oil) of materials on an annual basis. Therefore, adding other materials to the existing curbside program is an important alternative that should be evaluated.

The curbside recycling program currently collects newspaper, glass, aluminum and tin cans, PET plastic, and used motor oil. This program could be expanded to include collection of additional materials. The waste characterization study shows that cardboard comprises 4% of the residential subwastestream. High-grade paper and mixed waste paper account for 16% of the residential subwastestream. Plastics other than PET (including HDPE, LDPE, polystyrene, PVC and polypropylene) account for 4% of the residential wastestream. By adding some or all of these materials to the curbside recycling program over the short and medium-term, the City could achieve additional diversion from the residential waste stream while providing such a service in a manner which is very convenient for residents. In order to implement

collection of additional materials the City would need to work with Mission Trail Waste Systems to determine which materials can be added most easily using the existing collection containers and collection vehicles. Maximum diversion at a minimum cost would be achieved by adding collection of corrugated cardboard, magazines and HDPE to the recycling programs in the short-term planning period.

Adding these materials to the curbside collection programs will be driven, in large part, by available local markets. A strong market already exists in the Santa Clara area for old corrugated cardboard. There also appear to be markets opening up for magazines and HDPE. Therefore, collection of these materials could commence in the short-term planning period. The City will need to do additional market development work and research before it can begin to collect LDPE, polystyrene, polypropylene, PVC, and other plastics. Since these materials would be collected in relatively small quantities, and are extremely light in weight, the City will need to address the issues of market price and transportation costs. Market development efforts will also need to be focused on mixed paper.

Expanded curbside collection scores high on the evaluation matrix with a total of 45 points. It does not create a hazard or cause a shift from one waste type to another, and it can be implemented in the short-term period. In addition, this alternative is consistent with local plans and faces no institutional barriers. End markets are available for cardboard, magazines, and HDPE. The alternative also requires no new facilities and the materials can be collected on the existing trucks. The alternative is fairly flexible to changing conditions, except that once materials are added to a collection program, they cannot be dropped from the program without resulting in a lack of faith in the program by the community. There would be no additional cost to the City for collecting the additional materials above the current program.

An evaluation of collecting additional materials in the existing curbside recycling program is presented in Table 1 in Appendix IV-B.

b. Expansion of Recycling Program to Multi-Family Dwellings

The City is currently conducting a pilot multi-family recycling program that is intended to be implemented City-wide in the near future. Waste characterization results indicate that multi-family residences generate approximately 23,300 tons of refuse annually. The study shows that the multi-family subwastestream contains the following percentages of recyclable materials: newspaper, 11%; cardboard, 8%; high-grade and mixed paper, 17%; aluminum cans, 0.3%; recyclable glass, 8%; and

plastics, 7%. This indicates there is sufficient material available to warrant expansion of the pilot multi-family recycling program to a city-wide program.

In the short-term, the following materials could be targeted for recovery through a regular collection program at multi-family dwellings:

1. Recyclable glass, food and beverage containers
2. Metal (tin and aluminum) cans
3. Newspapers
4. PET plastic

Multi-family recycling scores high on the evaluation matrix with a total of 44 points. It does not create any hazard or cause a shift from one waste type to another. In addition, it can be implemented in the short-term, and is consistent with local plans. End markets are also available for all diverted materials. This program would divert a moderately large quantity of recyclable material. The one major disadvantage of this program is its cost, which is estimated to be between \$156,000 and \$306,000 per year. The City is funding its current pilot program with monies provided by the state Department of Conservation.

An evaluation of expanding the residential recycling programs to include multi-family dwellings is presented in Table 1 in Appendix IV-B.

c. Mobile Collection Systems

Mobile collection systems consist of portable collection bins or trailers that are placed at specific locations on a regular schedule. Most sites are open one to four hours, often on Saturdays. The sites are staffed by municipal employees, volunteers, or private contractors. Mobile collection systems are less expensive than curbside collection programs, but they are less convenient for residents and therefore result in lower recovery rates. These systems are a good way to introduce recycling to a community at a modest cost.

This alternative scores low on the evaluation matrix with a total of 35 points. Even though this alternative is more flexible than a curbside program, is implementable in the short-term, and has markets available for the diverted materials, mobile collection systems are not appropriate for the City at this time. The City already has a curbside

program, and a mobile collection system would recover too little material to justify the additional cost.

An evaluation of this alternative is presented in Table 1 in Appendix IV-B.

2. Identification and Evaluation of Alternative Commercial Recycling Programs

This section identifies and evaluates potential commercial recycling programs needed to achieve the City's recycling objectives.

a. Promote Commercial Recycling

The waste characterization study shows the City's commercial sector generates large quantities of recyclables which are currently being landfilled. The City could encourage and assist commercial recycling activities by doing the following:

1. Act as a resource center for the business community for information on recycling, such as markets, recycling companies, and technical assistance.
2. Promote the Santa Clara County Manufacturing Group's Guide to Commercial Recycling. This is a comprehensive guide that gives detailed information on recycling, source reduction, and local resources for commercial recycling.
3. Educate and assist businesses to source-separate commingled recyclables for collection or delivery to drop-off recycling centers.
4. Expand and promote the City's Commercial Waste Reduction Award Program.

The City's commercial waste reduction survey indicates high interest in recycling in the business community. Therefore the City's role should be to encourage businesses and organizations to initiate recycling programs and to take advantage of the many resources already available in the community.

Commercial recycling promotion scores high on the evaluation matrix with a total of 47 points. This alternative creates no hazard, is flexible, does not cause a shift from one waste type to another, and is implementable in the short-term. No new or expanded facilities would be required, and there are no institutional barriers. In addition, markets

are available for the majority of diverted materials. This program would have only a moderate impact on diversion, but would be fairly inexpensive.

An evaluation of this alternative is presented in Table 1 in Appendix IV-B.

3. Identification and Evaluation of Alternative System-wide Recycling Programs

This section identifies and evaluates potential system-wide recycling programs needed to achieve the City's recycling objectives.

a. Drop-off Recycling Centers

The City could sponsor the creation of additional drop-off centers. To use drop-off recycling centers, individuals or businesses segregate recyclable materials at the point of generation and then transport them to the drop-off location. Drop-off centers provide a low-cost supplement to curbside recycling programs because they reduce collection costs, which generally are the largest component of recycling program expense. A drawback of drop-off centers to the waste generator is their lack of convenience compared to curbside collection. In addition, residents do not receive money for their recyclables, as they do at a buy-back center.

This alternative scores low on the evaluation matrix with a total of 35 points. This alternative does not create a hazard or cause a shift from one waste type to another. It is also implementable in the short-term period and is fairly flexible to changing conditions. However, the disadvantage of this alternative is that the City already provides several recycling options for residents, including the curbside, buy-backs, and existing drop-off centers. Additional drop-off centers would not recover a sufficient amount of program materials to justify their cost. Possibly a better alternative for the City to pursue is to promote the existing drop-off locations.

An evaluation of this alternative is presented in Table 1 in Appendix IV-B.

b. Buy-back Centers

There are currently nine buy-back and 20/20 recycling centers in the City where residents can bring their recyclables. These centers process a total of 464 tons per year of PET, glass, and aluminum. The planned

Richard Avenue Recycling Facility will provide residents with an additional buy-back center when the facility opens next year. Based on the diversion results and other evaluation criteria applied to this new center, the City will determine the desirability of providing additional buy-back centers in the future.

Buy-back recycling centers are very similar to drop-off centers. The main difference is that buy-back centers pay customers for the materials received. The number and type of materials accepted at buy-back centers and the amount paid for the materials depends upon market conditions in the local area. Buy-back centers are a relatively low-cost supplement to curbside recycling programs. They usually appeal to customers and businesses that want to receive revenue for their recyclable materials. They share some of the same drawbacks as drop-off centers, in that customers must source separate and transport their materials to the buy-back location. They are not as convenient as curbside recycling programs and, therefore, result in lower diversion rates.

This alternative scores low on the evaluation matrix with a total of 36 points. At the present time, buy-back centers account for 2% of the City's total diversion. Therefore the addition of more buy-backs would have a minimal impact on the City's diversion rates. In addition, new facilities would have to be sited at a significant cost.

An evaluation of this alternative is presented in Table 1 in Appendix IV-B.

c. City-Operated Materials Recovery Facility

Materials Recovery Facilities (MRFs) are specifically designed to receive, separate and process mixed wastes and/or recyclable materials. MRFs often complement drop-off, buy-back, and curbside recycling programs because they can be used to process mixed wastes. Some materials recovery facilities are operated by hand-picking the mixed wastestream while other materials recovery facilities are highly mechanized and utilize sophisticated equipment to separate recyclable materials from mixed waste. MRFs currently offered by some vendors provide a combination of mechanized and hand-picking lines for optimal flexibility in recovering recyclable materials. Depending upon the configuration of the equipment, and the type of sorting performed at the facility, MRFs can recover and divert 15% to 50% of the incoming wastestream.

One advantage of utilizing a MRF is the large number and quantity of materials which can be separated and recovered. Another advantage is the economies of scale which can be realized when a facility serves several cities and the costs are spread over a large amount of tonnage. Use of a MRF is also very convenient for the waste generator because recyclable materials do not have to be source separated from refuse.

The main drawbacks of using a MRF are the possibility of high costs, the potential for contamination of recyclable materials, the long lead time and large amount of capital required to construct a facility, and the fact it does not educate or encourage the waste generator to recycle. Source separation programs segregate recyclables before they go into the garbage can or refuse truck and become contaminated. When a MRF is used, the recyclables are usually collected, commingled with the trash, and then sorted at the MRF. This can result in contamination of some materials, especially fiber. For example, if a jar of pizza sauce spills on a piece of cardboard or a stack of newspaper, either in the trash can or in the garbage truck, the cardboard or paper becomes contaminated and cannot be recycled.

MRFs can be very costly to build and to operate. Costs for utilizing a MRF can range from \$10 - \$70 per ton, depending upon the type of labor and equipment used, the amount of material recovered, and the financial arrangements with the MRF owner/operator. Therefore, the cost for processing the impacted residential and commercial waste stream from Santa Clara at a MRF could range from \$2 million to \$18 million.

The other potential drawback to a MRF is the possibility of a relatively long lead time between the time the facility is planned until it is actually sited, financed, constructed, permitted, and ready for operation. Developing a project of this magnitude is quite a large undertaking. It also requires close cooperation between the project proponent, the host city, and the potential users of the facility.

The City is fortunate to have access to the Zanker Road, Newby Island, and Richard Avenue MRFs. These facilities will recover materials from the City's commercial waste stream, while the City's curbside programs will recover materials from the residential and multi-family waste streams. The City still has the option of building its own MRF to avoid having to depend on the private sector to process its commercial wastestream; however, this would be very costly and most likely an unnecessary precaution. Therefore this alternative scores very low on the evaluation matrix with a total of 25 points. This alternative would be extremely costly, and it would be very difficult for the City to justify

the cost of such a facility when there are already several materials recovery facility options available.

The matrix showing the evaluation of this alternative is presented in Table 2 in Appendix IV-B.

d. Landfill Salvaging

Recyclable materials can be reclaimed by picking out materials that are delivered to landfills. The types of materials that are reclaimed largely depend on the availability of markets for materials. These materials generally include scrap metal, wood waste, white goods or large appliances, furniture, and corrugated cardboard.

As mentioned earlier, the All Purpose Landfill currently operates a landfill salvaging program which diverted 19,238 tons in 1990. The Landfill recently purchased a wood-chipping machine to increase the diversion of wood waste. This operation could be expanded to increase the amount and number of materials diverted. This alternative is presented as an expansion of the current landfill scavenging program with the following components:

- Increased salvaging efforts to recover more materials;
- Diversion of recyclables by spotters who would instruct and assist self-haulers to deposit materials in the drop-off depot;
- Disposal rate incentives to encourage source separation by self-haulers; and,
- Possible sorting of high-grade commercial fiber loads. This type of program could offer a cost-effective method to divert recyclables at the point of disposal.

In operating a landfill salvage program, care must be taken to assure safety of the workers, since landfills typically receive a high volume of traffic and utilize several large pieces of heavy equipment. The amount of material which can be recovered through landfill salvaging is generally not as great as that which can be recovered through use of a Materials Recovery Facility.

This alternative scored low on the evaluation matrix with a total of 36 points. Although expansion of the landfill salvaging operation could result in a higher material diversion rate, the All Purpose Landfill will

close by the end of 1993, and therefore the City's limited resources are better spent on programs with long-term potential.

An evaluation of this alternative is presented in Table 2 in Appendix IV-B.

e. Planning and Building Code Modifications

Another alternative for promoting recycling in the residential and commercial sectors is to revise the City's planning and building codes to allow and encourage recycling. Most multi-family residences and most business establishments in the City do not have space set aside for the placement of containers or bins to store recyclable materials. In order to make recycling as easy as possible, the City could revise building and planning codes to require extra space in single-family residences, multi-family buildings, commercial and industrial buildings for the placement of recycling bins or containers. New developments should also provide access for recycling collection vehicles.

The City could also consider the establishment of Market Development Zones which are provided for under SB 1322. A community that is designated a Market Development Zone offers state and local government incentives to attract industries that use post-consumer waste in the manufacturing process to locate within the Zone.

This alternative scores mid-range on the evaluation matrix with a total of 42 points. This alternative does not create a hazard, or cause a shift in from one waste type to another, is implementable in the short-term, and requires no new or expanded facilities. This alternative is fairly flexible to changing conditions, but is not very consistent with local plans and faces some institutional barriers such as existing buildings where creating space for bin placement may be difficult or impossible. The cost of this alternative could be significant if it proves very time-consuming to design and enforce the ordinances and overcome political opposition.

An evaluation of this alternative is presented in Table 2 in Appendix IV-B.

f. Rate Structure Modifications

1. Disposal Fee Modifications

The City could increase the disposal fee at the All Purpose Landfill as part of a strategy to encourage recycling. Increasing the fee at the All Purpose Landfill would cost the City very little and may have some impact on recycling as the increased cost is passed on to residents and businesses. The increased revenues to the City could be used to fund other programs.

There are, however, several other landfills where the City's haulers dispose of waste, including Newby Island and Kirby Canyon. Therefore, an increase in tipping fees at All Purpose may simply result in a transfer of disposal to other facilities. Furthermore, this landfill will close in 1993, at which point this program would be discontinued.

The City could explore the possibility of requiring all landfills that accept waste hauled from Santa Clara to charge an increased fee for waste from the City. Many studies have shown that there is a direct correlation between increased tipping fees and increased source reduction and recycling. However, this could involve administrative costs which the landfill operators would charge the City. Illegal dumping, and lying about source of waste would increase. The City would also incur its own administrative costs for this program. These two costs would reduce the increased revenue the City would receive for the waste disposed.

Disposal fee modifications scored low on the evaluation matrix with a total of 36 points. This alternative requires no new or expanded facilities, causes no shift in waste type created, and the cost would be moderate. However, the cost-effectiveness of this alternative is questionable. It is very likely that waste would either be routed to another landfill, as in the case of an increase in tipping fees at All Purpose. This alternative is inconsistent with local practices, and faces institutional barriers such as the accounting systems at the different landfills, which currently charge the same disposal fee for incoming waste regardless of which city it is delivered from (with the exception of the San Jose business tax which is charged for out-of-city refuse at the Newby Island and Kirby Canyon landfills). This alternative would also likely face opposition, making it difficult to implement in the short-term. Due to these potential administrative costs, it appears the City might be better served by implementing a garbage rate increase and by handling the administration of the increase in-house.

The evaluation matrix for this alternative is presented in Table 2 in Appendix IV-B.

2. Quantity-based User Fees

Quantity-based user fees charge households for refuse service based on the amount of garbage generated. The City's current flat rate-per-can system could be changed to a variable can rate system. Under a variable can rate system, residents are charged at an increasing rate for each additional garbage can. For example, the charge for one can would be \$5, the charge for two cans, \$12, and the charge for three cans would be \$21.

Another option for the City is to add a very low collection fee option for residents who generate very low volumes of garbage. This would reward the extremely conscientious citizens who recycle and reduce the majority of their trash, and would provide a low-cost billing option for low and fixed income residents.

A variable can rate system would cost relatively little to implement and could provide a strong incentive for residents to reduce and recycle. It would also educate the consumer about the rising costs of solid waste disposal. A variable can rate would focus residents' attention on waste reduction better than a flat rate-per-can system. Studies of communities with volume-based garbage collection fee systems show that these communities have higher recycling rates than those with a flat-fee structure. While a flat rate-per-can is a type of volume-based fee system, a variable can rate provides more motivation to residents because of the progressive increase in collection fees.

The main disadvantage of a variable can rate is a possible increase in illegal dumping. Refuse might be dumped in unlocked bins located at businesses, or on roadsides or vacant lots. The City might need to budget funds to clean up illegally dumped waste and to police unlocked dumpsters in the community. Local laws on dumping would need to be examined to determine whether they are stringent enough to discourage illegal dumping.

A variable can rate could adversely impact the City's composting plan by causing residents to dispose of non-yard wastes in the rubbish program. This would contaminate the green waste and degrade the quality of the finished compost product. This would also increase the rubbish collection program costs.

This alternative has a moderate score on the evaluation matrix with a total of 40 points. The advantages of this alternative are that it is a flexible system, it causes no shift in the types of waste created, it is

implementable in the short-term, and requires no new or expanded facilities. It is consistent with local plans and ordinances, although the ordinance setting garbage rates would need to be revised. The drawbacks of this alternative are uncertain costs (if illegal dumping or rubbish contamination result), a possible hazard of illegally dumped waste, uncertain impacts on recycling, and possible institutional barriers since this alternative could be politically unpopular.

The evaluation for this alternative is presented in Table 2 in Appendix IV-B.

3. Weight-based Fee System

In a weight-based fee system a resident's trash is weighed as it is picked up, and fees are charged accordingly. A truck with a scale and data entry system collects waste and records the weights for each household. This system is attracting the interest of many municipalities in the country. Two cities, Seattle, Washington, and Farmington, Minnesota, are currently conducting pilot programs for a weight-based fee system.

The advantages of this alternative are that it provides the most equitable system of garbage service fees and a strong incentive to recycle. Residents are charged for the precise amount of waste disposed, resulting in reduced garbage fees for even a small degree of waste reduction. Often residents do not take the first steps towards recycling because there is no financial benefit. Even with a variable can rate, a household must often reduce its waste substantially to qualify for a smaller can or fewer cans. A weight-based fee system would provide these residents with an immediate and tangible economic benefit for waste reduction. This system would also educate residents about the rising costs of solid waste disposal.

This alternative had a low score of 39 points on the evaluation matrix. It would have a strong impact on waste disposal, is flexible, causes no shift in waste type created, and the alternative is consistent with local plans. The garbage rate ordinance would need to be modified, however, to reflect this new system.

The principle drawback to this alternative is its high cost. The City would have to spend \$5,000 to \$10,000 per truck to implement this system for city-wide residential collection.

This would result in a total cost of \$30,000 to \$100,000 to equip all six residential refuse collection vehicles with scales and data entry systems. Additional costs due to increased time on collection routes could also be incurred. This alternative also has some of the same potential

drawbacks of a variable can rate, including a possible increase in illegal dumping, and contamination of green waste put out for rubbish collection. There may also be institutional barriers because it would be a new collection system that would require training for both City employees and hauler employees on how to use new processing and accounting systems.

This system could be kept in mind as a future alternative when the cost is less prohibitive, and the City has already adopted other, less costly rate structure modifications.

An evaluation of this alternative is presented in Table 3 in Appendix IV-B.

g. Market Development Activities

In order to increase the availability of markets for the materials recovered and thereby ensure the diversion of collected recyclables, the City could work on several market development activities. These would include acquiring information on materials markets, increasing the City's procurement of recycled products, and supporting efforts to increase markets for secondary materials. Activities could include participation in the endorsement of legislation that promotes the use of recycled materials (e.g. tax credits, price preferences, minimum content requirements) and assisting recycling industries to locate in the City of Santa Clara.

Market development is a multi-faceted task without immediate returns. The results of market development actions will be realized in future years. However, without markets for materials the City's recycling programs will not succeed. Therefore the above-described market development activities would be a critical element of the City's long-term recycling strategy.

This alternative scores high on the evaluation matrix with a total of 44 points. This alternative creates no hazard, is flexible to changing conditions, causes no shift in waste type created, and is implementable in the short-term. No new or expanded facilities are required. It is fairly consistent with local practices, with the exception of a procurement policy giving a price preference to products manufactured with recycled materials. Such a policy would also face institutional barriers such as a lack of reasonably-priced products made from recycled materials. The cost of this alternative would be moderate, depending on the price preference specified. Available local markets for diverted materials is not applicable, and therefore receives a high score.

An evaluation of this alternative is presented in Table 3 in Appendix IV-B.

h. Materials Handling Methods

Various recycling collection programs offer different benefits to the generator and the community. Source separation of recyclables requires more effort by the generator, but is less costly to the community. The use of a MRF requires no effort by the generator, but is more costly to the community.

The City already provides several different recycling options to the community through the curbside program, buy-back centers, and the Richard Avenue recycling facility. The Newby Island and Zanker Road recycling facilities are another option available the the City of Santa Clara. In addition, the City could re-route commercial collection vehicles in order to minimize contamination of recyclables. This would allow for separate collection of dry and wet wastes.

The City's MRF operators and the contractor for the curbside program are collecting sufficiently clean and uncontaminated recyclables. Therefore, the City does not need to develop any additional policies for recycled materials handling methods at the present time. this alternative recovers a low score on the evaluation matrix, 36 points.

An evaluation of this alternative is presented in Table 3 in Appendix IV-B.

i. Expansion of City Offices Recycling Program

The City could expand the current recycling activities at the City offices to increase participation and to collect additional materials. This program currently collects computer paper, white ledger paper, colored ledger paper, scrap metal, motor oil and batteries. Additional material could include mixed paper and newspaper. These materials could be easily added to the existing program to increase the recycling rate of the program.

This alternative scores high on the evaluation matrix with a total of 47 points. This alternative creates no hazard, is flexible to changing conditions, and causes no shift in waste type created. It is implementable in the short-term, and is consistent with local policies. There would be approximately 100 tons per year of waste reduction.

The program would be inexpensive, and would provide a positive example to the community.

An evaluation of this alternative is presented in Table 3, located in Appendix IV-B.

j. Legislative Support

Since legislation is most effective on the regional or state level, the City could work with other jurisdictions to support and lobby for recycling legislation. A staff person could be assigned to track state legislative developments through the League of Cities Legislative Bulletin, and to distribute information to other staff. This would assist the City in its AB 939 planning and designing local waste reduction policies that complement and promote state regulations. When bills of special importance were identified, staff could notify the City Manager and City Council so the City could take an official position in support of such bills.

This alternative scores high on the evaluation matrix with a total of 47 points. This alternative creates no hazard. It is flexible and can reflect changing conditions. It would cause no shift in the type of wastes created. A legislative support program can be implemented immediately, and requires no new or expanded facilities. It is consistent with local policies and faces no institutional barriers. The cost is little for waste reduction in the short-term. However, this alternative would improve the City's long-term capabilities to design source recycling programs by providing a vital base of knowledge about state legislation on recycling.

An evaluation of this alternative is presented in Table 3, located in Appendix IV-B.

D. SELECTION OF RECYCLING PROGRAMS

The following section describes the City's selected recycling programs. This section is presented in three parts: residential recycling program selection, commercial recycling program selection, and system-wide recycling program selection.

The City has selected the following recycling programs:

- Curbside Program Expansion
- Multifamily Recycling Program
- Evaluate Feasibility of other Quantity Based User Fees
- Commercial Recycling Promotion
- Legislative Support
- Market Development
- Evaluate Planning and Building Code Modifications
- City Offices Recycling Program Expansion

A large portion of the City's diversion will result from the private MRFs. The remaining diversion will result from the City's curbside program, private commercial programs, and the City's drop-off and buyback centers. Since the private sector will provide diversion of commercial waste through the MRFs, the City will provide diversion of residential waste through the curbside programs. The City will also provide programs to develop markets to support the private sector MRFs, and to encourage businesses to initiate their own recycling programs. In this way, the City will take advantage of the private sector MRFs, will provide a range of recycling options for the community, and will act as a coordinator for the various public and private recycling activities.

The City's goal is to provide incentives for residents to recycle and to produce options for how and where to recycle. Implementing quantity-based user fees, if feasible, could provide more incentives to recycle. The curbside collection of many different types of materials will make it easy to recycle. The drop-off and buyback centers will supplement the

curbside programs for residents who wish to sell their recyclables, or who generate a large amount of material.

Tables 3 and 4 show the diversion which will be achieved by each selected program for the short and medium term. The selected programs will allow the City to divert 32.51% of its waste by 1995 and 53.58% by 2000. The list of assumptions used to construct Tables 3 and 4 are presented in Appendix IV-C.

Table 3

CITY OF SANTA CLARA: 1995 WASTE GENERATION AND RECYCLING TONNAGES

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

MATERIAL		residential curbside	multi-family curbside	city offices	HHW	composting	buyback/ 20/20	drop off	commercial on-site	concrete/ asphalt	richard ave	newby	zanker	TOTAL DIVERTED	TONS R LANDFILLED	TOTAL MSW	DIVERSION PERCENT
PAPER	OCC	781.50	920.60	0.00	0.00	0.00	0.00	0.00	4,077.85	0.00	6,336.05	4,336.00	2,191.20	18,643.20	19,158.61	37,801.81	49.32%
	MIXED PAPER	355.23	943.00	0.00	0.00	0.00	0.00	20.00	96.60	0.00	3,282.53	51.05	1,135.20	5,883.61	18,540.87	24,424.48	24.09%
	NEWSPAPER	2,145.94	646.00	0.00	0.00	0.00	0.00	200.14	298.08	0.00	858.80	157.08	0.00	4,306.04	7,554.75	11,860.79	36.30%
	HIGH GRADE	0.00	0.00	19.87	0.00	0.00	0.00	0.00	2,695.97	0.00	1,545.84	226.97	534.60	5,023.25	5,506.60	10,529.84	47.70%
	OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.16	0.00	0.00	1.20	0.00	45.36	15,800.37	15,845.73	0.29%
PLASTICS	HDPE	213.00	174.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	610.70	7.03	211.00	1,215.73	2,644.58	3,860.31	31.49%
	PET	20.06	46.60	0.00	0.00	0.00	5.70	1.02	36.43	0.00	38.17	0.10	15.00	163.08	140.45	303.53	53.75%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	113.90	0.00	113.90	11,314.34	11,428.24	1.00%
GLASS	CAL REDEMPTION	541.17	303.00	0.00	0.00	0.00	250.43	11.20	529.92	0.00	400.78	5.00	0.00	2,041.50	1,924.63	3,966.13	51.47%
	RECYCLABLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	603.60	0.00	95.42	1.00	0.00	700.02	1,117.91	1,817.93	38.51%
	OTHER RECYCLABLE	360.78	0.00	0.00	0.00	0.00	2.04	0.00	176.64	0.00	286.26	2.00	0.00	827.72	1,643.21	2,470.93	33.50%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.15	243.15	0.00%
METALS	ALUMINUM CANS	33.59	52.44	0.00	0.00	0.00	214.80	1.02	34.22	0.00	57.25	2.00	0.00	395.32	371.96	767.28	51.52%
	TIN CANS	91.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	229.01	0.86	0.00	321.49	1,229.06	1,550.54	20.73%
	FERROUS	0.00	0.00	69.55	0.00	0.00	0.00	0.00	1,974.61	0.00	1,774.85	82.82	0.00	3,901.83	6,742.06	10,643.89	36.66%
	NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.50	0.00	0.00	0.00	0.00	42.50	483.00	525.50	8.09%
	BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.32	24.32	0.00%
GREEN WASTE	GREEN WASTE	69.20	0.00	0.00	0.00	10,000.00	0.00	0.00	284.83	0.00	0.00	621.00	0.00	10,975.03	16,346.91	27,321.94	40.17%
ORGANICS	FOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22,370.17	22,370.17	0.00%
	WOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,302.07	0.00	3,530.63	6,748.00	1,221.00	16,801.70	6,567.05	23,368.75	71.90%
	TEXTILES/ATHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,215.77	1,215.77	0.00%
	TIRES/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.66	0.00	0.00	0.00	0.00	17.66	6,563.78	6,581.45	0.27%
	AG. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.08	0.00	0.00	0.00	0.00	22.08	241.45	243.53	8.38%
OTHER COMPACTED WASTES	WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	189.88	0.00	0.00	0.00	0.00	189.88	1,200.98	1,390.86	13.65%
	DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,702.08	1,702.08	0.00%
	HHW*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,630.00	3,630.00	0.00%
	OTHER	0.00	0.00	4.00	0.00	0.00	0.00	0.00	1.10	0.00	0.00	293.00	0.00	298.10	29,833.20	30,131.30	0.99%
UNCOMPACTED	INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,596.00	1,190.87	0.00	411.84	20,198.71	7,177.45	27,376.16	73.78%
TOTALS		4,612.10	3,085.64	93.42	36.12	10,000.00	472.96	233.37	16,428.22	18,596.00	20,237.16	12,648.99	5,719.84	92,127.70	191,288.70	283,416.39	32.51%
Percent of msw diversion		1.6%	1.1%	0.0%	0.0%	3.5%	0.2%	0.1%	5.8%	6.6%	7.1%	4.5%	2.0%				
percent of subwastestream diversion		13.0%	13.2%	0.0%	0.0%	28.2%	0.8%	0.4%	8.2%	9.3%	10.1%	6.3%	2.9%				

* HHW does not include motor oil, battery, and misc. HHW diversion 483.61 tons in Total diverted and Total MSW.

Table 4

CITY OF SANTA CLARA: 2000 WASTE GENERATION AND RECYCLING TONNAGES

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

MATERIAL	residential curbside	multi-family curbside	city offices	HHW	composting	buyback/ 2020	drop off	commercial on-site	concrete/ asphalt	richard ave	newby	zanker	Total Diverted	Tons R Landfilled	Total MSW	Diversion Percent
PAPER																
OCC	775.25	912.64	0.00	0.00	0.00	0.00	0.00	9,500.00	0.00	7,347.68	11,825.00	2,099.70	32,460.26	4,964.04	37,424.31	86.74%
MIXED PAPER	352.16	935.01	0.00	0.00	0.00	0.00	40.00	7,500.00	0.00	3,806.63	3,060.00	1,121.00	16,814.80	7,140.70	23,955.50	70.19%
NEWSPAPER	2,128.73	640.83	0.00	0.00	0.00	0.00	198.54	1,900.00	0.00	995.82	801.00	0.00	6,664.92	5,011.61	11,676.53	57.08%
HIGH GRADE	0.00	0.00	20.23	0.00	0.00	0.00	0.00	2,000.00	0.00	1,664.61	1,440.00	475.90	5,600.74	4,975.70	10,576.43	52.95%
OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	550.00	0.00	0.00	1.19	0.00	551.19	14,975.25	15,526.45	3.55%
PLASTICS																
HDPE	211.30	172.52	0.00	0.00	0.00	0.00	0.00	1,000.00	0.00	708.21	570.00	208.60	2,870.63	913.51	3,784.13	75.86%
PET	19.90	46.23	0.00	0.00	0.00	5.65	1.01	100.00	0.00	44.26	36.00	12.50	265.55	35.63	301.18	88.17%
OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,000.00	0.00	0.00	114.00	0.00	2,114.00	9,080.88	11,194.88	18.88%
GLASS																
CAL REDEMPTION	536.84	300.58	0.00	0.00	0.00	248.43	11.11	1,000.00	0.00	464.76	1,190.00	0.00	3,751.72	194.66	3,946.38	95.07%
REFILLABLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	500.00	0.00	110.66	178.00	0.00	788.66	1,005.89	1,794.55	43.95%
OTHER RECYCLABLE	357.89	0.00	0.00	0.00	0.00	2.02	0.00	800.00	0.00	331.97	534.00	0.00	2,025.88	416.18	2,442.06	82.96%
OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.19	238.19	0.00%
METALS																
ALUMINUM CANS	33.32	52.00	0.00	0.00	0.00	213.08	1.01	150.00	0.00	66.40	107.00	0.00	622.81	135.21	758.01	82.16%
TIN CANS	90.89	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	265.58	214.00	0.00	680.47	839.56	1,520.02	44.77%
FERROUS	0.00	0.00	76.80	0.00	0.00	0.00	0.00	6,000.00	0.00	2,058.23	1,104.00	0.00	9,239.03	1,387.19	10,626.22	86.95%
NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	150.00	368.88	518.88	28.91%
BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.82	23.82	0.00%
GREEN WASTE																
GREEN WASTE	69.08	0.00	0.00	0.00	18,800.00	0.00	0.00	3,000.00	0.00	0.00	621.00	0.00	22,490.08	4,302.81	26,792.89	83.94%
ORGANICS																
POOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21,913.39	21,913.39	0.00%
WOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.00	0.00	3,801.88	7,138.00	1,217.54	18,157.42	5,247.01	23,404.43	77.58%
TEXTILES/LTHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,190.95	1,190.95	0.00%
TIRES/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	3,000.00	3,448.77	6,448.77	46.52%
AO. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	100.00	160.27	260.27	38.42%
OTHER																
WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	700.00	680.83	1,380.83	50.69%
DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,667.32	1,667.32	0.00%
HHW*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,007.11	4,007.11	0.00%
OTHER	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	345.00	0.00	349.00	29,270.89	29,619.89	1.18%
UNCOMPACTED																
INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,090.00	1,282.37	1,115.00	409.80	20,897.17	6,601.86	27,499.03	75.99%
TOTALS	4,575.35	3,059.80	101.02	36.12	18,800.00	469.18	251.67	46,060.00	18,090.00	22,949.05	30,393.19	5,545.04	150,294.31	130,198.09	280,492.40	53.58%
Percent of msw diversion	1.6%	1.1%	0.0%	0.0%	6.7%	0.2%	0.1%	16.4%	6.4%	8.2%	10.8%	2.0%				
percent of subwastestream diversion	12.9%	13.1%	0.1%	0.0%	52.9%	0.8%	0.4%	23.0%	9.0%	11.4%	15.2%	2.8%				

*HHW does not include motor oil, battery, and misc. HHW diversion of 1002.59 tons in Total Diverted and Total MSW.

1. Residential Recycling Program Selection

a. Curbside Program Expansion

Description

The City's current residential program will be expanded to take advantage of the existing local resources such as processing facilities, markets, and public support. The City will be able to process additional collected materials at the Richard Avenue Recycling facility.

The City will expand the residential curbside recycling program in the following ways:

- Expanding the public education campaign
- Adding cardboard, magazines, and HDPE to collection programs

Justification

The waste characterization study shows that there is still a high volume of recyclables in the residential and subwastestream. The residential subwastestream is 4.4% cardboard, 14.5% mixed waste paper, and 1.2% HDPE. Adding materials to the curbside program makes recycling convenient for residents, and brings clean, source-separated recyclables to the processing facility.

Short-term projected diversion

The residential curbside program will divert 1.7% of the City's waste during the short-term period.

Medium-term projected diversion

The residential curbside program will divert 1.7% of the City's waste during the medium-term period.

b. Multi-family Recycling Program

Description

The current pilot multi-family recycling program will be implemented City-wide by the year 1995. Recycling will be offered to all of the City's 17,000 multi-family residences. This program will collect the same materials as the residential curbside program, and will include the addition of cardboard, magazines and HDPE. The program will be publicized via flyers sent to residents.

Justification

The waste characterization study shows there is a significant volume of recyclables in the multi-family subwastestream: Aluminum cans (0.3%), glass (6%), PET (0.4%), HDPE (1.5%), cardboard (8%), newspaper (11%), and mixed paper (16%). A multi-family collection program could recover from 50 - 75% of these materials by making recycling convenient for residents. The pilot program shows that there is sufficient participation to warrant expanding the program city-wide, with an average of 8.6 tons per month collected with four multi-family residences participating.

Short-term projected diversion

This program will divert 1.1% of the City's waste.

Medium-term projected diversion

This program will divert 1.1% of the City's waste.

c. Evaluate Feasibility of Quantity-based User Fees

Description

The City will evaluate the feasibility of a variable can rate for residential garbage service. If the City determines that a variable can rate will not result in an increase in illegal dumping, and program funding would be available, and that the waste generation rate is higher than anticipated, then this alternative will be implemented. The City will survey residents, haulers and landfill personnel to evaluate the relation of potential illegal dumping to a variable can rate.

The City will examine other jurisdictions which have established variable can rates to determine whether illegal dumping or other problems were encountered and how these problems were solved.

Upon completion of the evaluation, staff will make a recommendation to the City Manager and City Council concerning whether to change the residential garbage rate system.

Justification

The City currently has a flat can rate for residential garbage service, providing a financial incentive for residents to reduce the volume of their waste. A variable can rate would present an even stronger financial incentive to reduce waste. These types of systems could have a significant impact on residential waste generation in the City. However, the City must evaluate the necessity of this rate structure after future waste generation studies. If these studies indicate that the City's waste generation rate is declining, then a change in rate structure may be unnecessary.

Projected Diversion

Diversion for this program will be quantified as part of the City's evaluation of the feasibility of this alternative.

2. Commercial Recycling Program Selection

The City will rely on voluntary participation by companies in recycling activities in the short term. Based on the commercial recycling survey, many firms in Santa Clara are planning to expand or implement a recycling program. There are several drop-off and buyback centers where companies can take recyclables, and haulers are beginning to collect recyclables from businesses.

a. Commercial Recycling Promotion

Description

The City will encourage businesses and organizations to enact recycling programs. The City will publicize the resources available to the business community such as the Santa Clara Manufacturing Group's Guide to Commercial Recycling, the City's drop-off and buy-back locations, and the City's waste evaluation services. The City will

expand promotion and publicity of its award for commercial waste reduction and will offer engraved plaques to winning firms. The City will promote the award and awards ceremony through the following measures:

- The award will be publicized through local media including newspapers, trade journals, and radio.
- The City will investigate the feasibility of presenting the awards in a specially scheduled event. Currently, the awards are presented at a City Council meeting. A special event would lend more prestige to and interest in the award.

In the short-term the City will ask for a voluntary submission of commercial source reduction and recycling plans from all businesses and organizations holding a City business license which have an office or site located within the City limits. The City will request a description of recycling and source reduction programs, procurement policies, and diversion estimates. The City will emphasize that these plans will be considered when awarding the Commercial waste reduction prize.

If diversion goals are not being achieved through the use of a voluntary program, the City will require mandatory submittal of commercial source reduction plans from all businesses holding a business license in the medium-term.

Justification

Commercial and industrial waste accounts for 77% of the City's wastestream. Diversion from this sector will have a significant impact on the City's overall diversion rate. Given that the private sector will provide MRFs that will recover the City's commercial waste, the best role for the City to play in commercial recycling is a support and facilitator role. The City will rely on the efforts of the private sector to provide commercial recycling, and will support and encourage local businesses to recycle and take advantage of local resources.

Short-term Projected Diversion

This program will divert 5.9% of the City's waste.

Medium-term Projected Diversion

This program will divert 16.6% of the City's waste.

3. System-wide Recycling Programs

a. Legislative Support

Description

The City will devote staff time to monitoring state and federal legislation on source reduction and recycling. City staff will be sent to relevant local conferences. The City will explore on-line data services with legislative information, subscribing to legislative journals, and coordinating with other cities to share information.

Justification

It is crucial that local solid waste officials keep abreast of state legislative developments in order to design local legislation that augments and enhances state legislation. By monitoring the state's legislative trends, the City will better be able to anticipate new regulations and design City programs accordingly. Legislative support is one of the primary functions for local governments in the development of the recycling industry.

Projected Diversion

There will be no direct diversion of waste resulting solely from this program.

b. Market Development

Description:

The City will acquire information on materials markets, and support initiatives to increase markets for secondary materials. Activities could include participation in the endorsement of legislation that promotes use of recycled materials (e.g., tax credits, price preferences, minimum content); and assisting recycling industries to locate in the area. Hotels and other large generators of cardboard would be encouraged to work with major grocery chains to include their materials in the current back haul transportation network for delivery to end user mills.

The City will evaluate the feasibility of adopting a procurement policy giving a price preference to recycled, durable, reusable, and recycled materials. Currently the City does not have the funds available to

specify a price preference for recycled and waste-minimizing products, which can be more expensive than products made from virgin materials. The City will continue to purchase recycled materials whenever economically feasible, and will actively pursue suppliers of reasonably priced, recycled materials.

Justification:

Secondary materials must be sold, used to make products, and the products purchased. These actions are essential to achieve recycling goals. They are especially needed as the rate of material recovery increases.

Projected Diversion

There will be no direct diversion of waste resulting solely from this program.

c. Evaluate Feasibility of Planning and Building Code Modifications

Description

The City will evaluate the feasibility of passing local ordinances that encourage recycling. The City will consider revising planning and building codes to designate extra space for recycling bins in single and multi-family residences, commercial and institutional buildings.

Justification

Lack of space and access limit participation in recycling programs. The City's current building codes do not specifically promote the design of recycling-friendly buildings.

Projected Diversion

Diversion for this program will be quantified as part of evaluating the feasibility of this program.

d. City Offices Recycling Program Expansion

Description

The City will increase the recovery rate in the City offices recycling program through employee education and program promotion. Colored ledger paper and newspaper will be added to the current collected materials.

Justification

The City offices recycling program demonstrates to the community the City's commitment to recycling. It also improves the City's internal commitment to recycling. The City anticipates that the recovery rate in the City offices can be improved through encouraging employees to recycle.

Short-term Projected Diversion

This program will divert less than 1% of the City's waste.

Medium-term Projected Diversion

This program will divert less than 1% of the City's waste.

4. Materials Markets

There are ample processing facilities and markets in the South Bay for all of the City's recyclables, as well as any recyclables from private or commercial recycling programs. Some of the major buyers of recycled materials in the region include Consolidated Fibers, ABC Recycling and the Container Corporation of America/Jefferson Smurfit.

Chipped wood will be used either for landscaping or as boiler fuel for industry in the Bay area.

The City will utilize the materials handling capabilities at Newby Island and Zanker Road landfills, and at the planned Richard Avenue Recycling facility to process the recyclables from the City's curbside programs. The Guadalupe Mines landfill will be used as a backup facility, especially for wood processing.

E. PROGRAM IMPLEMENTATION

The following pages list the specific steps required to implement each of the selected recycling alternatives. A table showing each task and when it will be accomplished appears in Appendix IV-D.

1. Expand Curbside Recycling Program

Overview

The City will expand the residential curbside recycling program by adding cardboard, magazines and HDPE to the list of materials already collected beginning in 1991. The public education campaign will be expanded to inform all single dwellings of the future program changes.

Responsible Agency

The City (Department of Public Works) and Mission Trail Waste Systems (contractor) will be responsible for expanding the curbside recycling program.

Tasks

1. Planning and Development (Department of Public Works)

- Secure authority and funding for the program expansion.
- Determine schedule for adding cardboard, magazines and HDPE to single-family dwelling collections (with contractor).
- Estimate quantity of additional materials to be collected from single-family dwellings (with contractor).
- Confirm market specifications and agreements for new materials (with contractor).

2. Program Implementation (Contractor)

- Review and redesign single-family collection routes based on estimates of additional cardboard, magazine and HDPE to be collected.

- Secure materials markets agreements (e.g. delivery method, degree of separation required, pricing arrangements) for cardboard, magazines and HDPE.
- Initiate service.

3. Promotion and Education (Contractor and Department of Public Works)

- Develop "quick-check" cards to leave on buckets. Cards will remind residents about acceptable and unacceptable items, as well as procedures for preparing items.
- Develop promotion and education materials to inform single-family dwellings of additional materials to be collected.
- Coordinate promotion and education schedule.
- Distribute materials.

4. Research and Evaluation (Department of Public Works and Contractor)

- Evaluate the feasibility of including plastics other than PET and HDPE in the curbside programs.
- Evaluate the feasibility of adding mixed and high-grade paper to the curbside programs.

Annual Program Cost

The fiscal year 1991-1992 costs of expanding the curbside recycling program are detailed below.

Single-family Collections	\$ 0
(Including new materials)	(included in existing agreement)

2. Multi-Family Recycling Program

Overview

The pilot multi-family recycling program is proposed to be expanded. Collection will be offered to all 17,100 multi-family dwellings by 1995. Initially the program will collect glass, aluminum and tin cans, newspaper, and PET. Cardboard, magazines and HDPE will be added to the program.

Tasks

1. Planning and Development (Contractor and Department of Public Works)

- Assign or reassign staff to coordinate expansion to all multi family dwellings.
- Confirm the number of multi-family dwellings to be served, potential recovery levels, capital and operating costs, and schedule.
- Determine schedule for adding cardboard, magazine and HDPE (with contractor).
- Estimate quantity of materials to be collected (with contractor).

2. Program Implementation (Contractor)

- Order vehicles and bins.
- Design collection routes.
- Redesign routes to collect additional materials.
- Secure materials markets agreements.
- Receive/test recycling vehicles.
- Receive/distribute recycling bins and promotional information.
- Initiate service.

3. Promotion and Education (Contractor and Department of Public Works)

- Develop "quick-check" cards to leave on bins. Cards will remind multi-family residences about acceptable and unacceptable items, as well as procedures for preparing items.
- Coordinate promotion and education schedule.
- Distribute materials.

4. Research and Evaluation (Department of Public Works and Contractor)

- Evaluate the feasibility of including plastics other than PET and HDPE in the curbside programs.
- Evaluate the feasibility of adding mixed and high-grade paper to the curbside programs.

Annual Program Cost

The fiscal year costs of implementing the program city-wide are detailed below.

Multi-family collections	\$153,000-306,000 (\$.75 to \$1.50 per unit per month)
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3. Legislative Support

Overview

The City will track legislative developments and trends at the state and federal level. Legislature topics to be tracked include, but are not limited to: economic and non-economic incentives to promote residential and commercial recycling; creation and stimulation of materials markets; and grant programs.

Responsible Agency

The City (Department of Public Works) will be responsible for tracking legislative developments.

Tasks (Public works Department)

- Assign staff person to oversee program
- Subscribe to legislative journals
- Investigate feasibility of using on-line legislative tracking service and coordinate with other jurisdictional organizations to minimize costs.
- Develop an in-house network for reviewing and analyzing solid waste legislation of particular significance to the City.
- Prepare reports to the City Manager and City Council on important legislation.

Annual Program Costs

The fiscal year 1991-1992 costs of developing a legislative support program are included in the current budget.

4. Market Development

Overview:

The City will take on a variety of activities to strengthen and expand existing secondary materials markets as well as encourage the development of new secondary materials markets.

Responsible Agency

The City (Department of Public Works) will be responsible for carrying out programs and analyses related to market development. Where appropriate, the City Council will enact and support ordinances and legislation promoting recycling market development.

Tasks (Public Works Department)

- Survey local materials markets to determine future demand for increased material supply as well as their ability to expand.
- Support state and federal legislation that promotes the use of recycled products (e.g. tax credits to companies using secondary materials, procurement preference to suppliers with products that are durable, recycled, reusable or recyclable, setting standards to require that products contain a minimum percentage of recycled material).
- Determine local and regional needs for new material markets.
- Work with other local governments in the region on economic incentives to attract businesses which use recycled materials new to the area (e.g., economic development projects, tax credits, property tax exemptions, modified zoning and planning requirements).
- Survey other cities and states that have adopted successful recycling procurement practices.
- Identify procurement regulations that have unnecessary requirements for purchasing products made from virgin materials.
- Review purchases made by the City to determine where recycled, recyclable, and durable products could be increased.
- Work with product manufacturers and suppliers to determine the availability and price of recycled, recyclable, and durable products.
- Determine economic impacts of providing price preferences for recycled, recyclable and durable products.
- Make recommendations to the City Council.

Annual Program Costs: \$500

5. City Office Recycling Program Expansion

Overview

The City will expand its recycling program within City offices by adding colored paper and newspaper to the collected materials. These efforts will begin in 1991.

Responsible Agency

The City (Department of Public Works) will be responsible for expanding the City offices' recycling program.

Tasks (Public Works Department)

1. Planning and Development

- Survey existing system and determine need for additional central collection containers to increase employee convenience.
- Evaluate feasibility of adding glass recycling to the program.

2. Promotion and Education

- Conduct brief education seminars to groups of city employees to review program requirements and changes, and to answer questions.
- Distribute updates to employees on regular basis detailing program successes.

Annual Program Cost: \$500

6. Awards and Public Recognition Program

Overview

The City will carry out activities to expand the number of public, private and non-profit organizations competing for the City's recycling award program beginning in 1991. Based on specific evaluation criteria, the City will formally award deserving recycling efforts.

Responsible Agency

The City (Department of Public Works) will be responsible for carrying out the program.

Tasks

- Design and produce promotional materials.
- Design award plaque.
- Formalize award evaluation criteria.
- Evaluate costs/ benefits of holding separate awards ceremony.

Annual Program Cost: \$500

7. Voluntary Submission of Source Reduction and Recycling Plans

Overview

The City will encourage all businesses and organizations to voluntarily submit a commercial source reduction and recycling plan beginning in 1991. If diversion targets are not achieved, the City will require mandatory submittal of source reduction and recycling plans after 1995.

Responsible Agency

The City (Department of Public Works) will be responsible for this program.

Tasks

- Design and produce announcement of request.
- Develop tracking system for plans submitted.
- Request all businesses and organizations holding business licenses and having offices within the city to submit plans.
- Receive, acknowledge, and review plans submitted.
- Follow-up with businesses to clarify data.
- Enter relevant information into city data base.

	<u>Short Term</u>	<u>Medium Term</u>
Annual Program Cost	\$2,000*	\$70,000
One new staff person	0	\$50,000
Contract labor	\$0	\$20,000

*(Note: Cost currently included in City's budget)

8. Evaluate Planning and Building Code Modifications

Overview

The City will evaluate the feasibility of revising its planning and building codes to require storage and collection areas for recyclables in single-and multi-family residences as well as commercial and industrial buildings. In addition, the City will consider revising the code to require that new buildings provide access for collection vehicles.

Responsible Agencies

The City (Planning Department and the Department of Public Works) will evaluate the feasibility of making modifications in the Planning and Building Code. These efforts will require significant support from the Department of Planning. If such modifications are feasible, the Santa Clara City Council will be responsible for adopting new ordinances and code changes.

Tasks

1. Planning and Development (Planning Department and Public Works Department)
 - The Departments of Public Works and Planning assign staff to review codes.
 - City staff to work with local architects, planners, building managers, recyclers, waste haulers in reviewing code.
 - City Departments make recommendations for code change to City Manager and City Council.

2. Program legislation (City Council)

- City Council holds hearings on proposed new ordinances and code changes.
- City Council approves new ordinances and codes.

3. Promotion and Education (Planning and Public Works Departments)

- Inform public about new code requirements by sending out press releases and holding press conference.
- Produce flyers for distribution at planning and zoning counters.
- Train staff in reviewing plans, notifying about compliance and answering questions.
- Evaluate benefits of having a media event when first large housing or commercial development project receives permit after complying with new codes.

Annual Program Cost

The cost for this program is included in the City's current budget.

9. Evaluate Feasibility of Quantity-Based User Fees

Overview

The City will collect and analyze data to determine the impact of variable can rate systems and weight-based rate systems on increasing recycling. The analysis will also focus on the opportunities and constraints of various quantity-based user fees.

Responsible Agency

The City (Department of Public Works) will be responsible for implementing this program.

Tasks (Public Works Department)

- Assess potential for illegal dumping, the effectiveness of local illegal dumping laws, including ease of enforcement, and potential clean-up costs if a variable can rate system were enacted by City.
- Survey the diversion effectiveness of variable can rates that have been enacted by other jurisdictions, including potential dumping problems and solutions to these problems.
- Prepare cost/benefit analyses on a variable can rate system
- Make recommendations to the City Manager and City Council.

Annual Program Cost

The cost for this program is included in the City's current budget.

9. Promote Commercial Recycling

Overview

The City will carry out a variety of activities to encourage businesses and organizations to enact recycling programs.

Responsible Agency

The City (Department of Public Works) will be responsible for implementing these activities.

Tasks (Public Works Department)

- Use local media public service announcements to inform the business community about the Santa Clara County Manufacturing Group's *Guide to Commercial Recycling*.
- Act as a resource center for the business community by setting up a commercial recycling hotline to answer questions.
- Develop a promotional brochure targeted to the business community with information on the many benefits of

recycling such as disposal cost savings, revenues from materials sales, and creating a positive public image.

- Create a speaker's bureau and schedule speakers at meetings of various local business organizations such as the Rotary Club.
- Make businesses aware of the City's and the private sector's waste evaluation services.
- Continue to work with the Santa Clara County Manufacturing Group.
- Make businesses aware of self-haul options, including the location of drop-off and buy-back centers, and the local MRFs.
- Expand the number of firms competing in the City's commercial waste reduction award program.
- Encourage business to voluntarily submit a commercial source reduction and recycling plan.

	<u>Short Term</u>	<u>Medium Term</u>
Annual Program Cost:	\$5,000*	\$20,000
Contract Labor	\$5,000	\$20,000

**(Note: Cost included in the City's current budget)*

F. MONITORING AND EVALUATION

This section describes the monitoring activities for the City's recycling programs. It is divided into two parts: 1) An overall monitoring procedure for all of the City's recycling programs; 2) Specific monitoring activities for four major recycling programs described in the implementation section.

1. Methodology For Monitoring Program

It will be necessary to establish a monitoring system to determine if recycling goals are being achieved. An evaluation process will also be required to determine which recycling programs are effective and which need to be modified.

a. Diversion Measurement

A format to determine standardized recovery rates from year to year will be necessary to monitor the impact of the recycling programs. There are several factors that need to be incorporated into a monitoring system. Data on wastestream composition will be obtained from an annual updated waste characterization study. Data on diverted recovery tonnages will be obtained from an annual waste diversion survey. These figures will need to be adjusted for increases or decreases in per capita waste generation, population growth, and changes in the ratio of residential to commercial and industrial generators.

The collection company will provide the City with monthly records of tonnages, routing, and number of stops, for both the curbside and multi-family recycling programs. The City will use this information to evaluate the effectiveness of the programs.

The City will distribute surveys to selected businesses and citizens to determine the level of participation in both residential and commercial recycling programs. Surveys will also be sent to recycling firms and buy-back and drop-off centers.

2. Administration of Monitoring Program

a. Recycling Program Evaluation Criteria

Written criteria will be used to evaluate the effectiveness of each recycling program. It is expected that the criteria will evolve as program experience is obtained. The initial criteria are:

1. Is the program diverting the amount of tonnage expected within the time frame envisioned?
2. Is the program's cost per ton averaging what was projected?
3. Is the program still the most cost-effective method of diverting the targeted tonnage?

b. Responsible Parties

Monitoring and evaluation of the recycling program will be part of an overall monitoring and evaluation program for all SRRE/HHWE activities. This will ensure a consistent level of quality, and a centralized system for handling reporting activity. Reviewers, such as the city council and the State, will be provided with uniform evaluations for all programs the Department of Public Works will be responsible for administration of the monitoring program.

c. Funding for Monitoring and Evaluation

All monitoring and evaluation activities for the City's recycling programs will be funded through the City's general fund as part of the budget for the Public Works department.

3. Specific Monitoring Tasks for Major Recycling Programs

a. Curbside Recycling Program Expansion:

Single-family dwellings

- Contractor will provide the City with monthly records of materials tonnages, routing and number of stops.
- Contractor will provide the City with monthly reports on recovery levels and material sales.

- Contractor will provide the City with quarterly reports on set-out and participation rates.
- Contractor will provide the City with an annual report on costs, revenues, equipment performance, program design and recovery levels, including recommendations for changes.
- The City will analyze residential refuse periodically to determine the impact of recycling programs on waste generation.
- The City will survey residents to determine awareness about recycling and to accept suggestions for improving/expanding programs.
- Contractor will continue to operate a hotline to respond to resident requests and problems.

Multi-family Dwellings

- Contractor will provide the City with monthly records of materials tonnages, routing, and number of stops.
- Contractor will provide the City with monthly reports on the program during the first 6 months of collection, focusing on program operations and problems and recommendations for changes.
- Contractor will provide the City with quarterly reports on set-out and participation rates.
- Contractor will provide the City with an annual report on costs, revenues, equipment performance, program design and recovery levels, including recommendations for changes.
- The City will analyze residential refuse periodically to determine the impact of recycling programs on waste generation.
- The City will survey multi-family residents during the first year of operation to determine the level of awareness about the program, to accept suggestions, and solve problems.
- Contractor will operate a hotline to respond to resident requests and problems.

b. Market Development

- Survey local and regional markets on a semiannual basis to determine current and future demand, prices, materials specifications, and plans for expansion.
- Work with local recycling companies to determine which new materials or materials sub-flows could be added to the City's collection programs.
- Work with local recycling companies to secure markets for all new materials accepted at the Richard Avenue, Zanker Road and Newby Island recycling facilities.
- Continue to work with local governments in the region to attract new companies which utilize recycled materials in their manufacturing processes to the Santa Clara area.

c. City Office Recycling Program Expansion

- The City will track monthly tonnages of individual materials, as well as total tonnages, and compare them to the previous 12-month totals.
- The City will track revenues generated from sale of individual materials and total materials and will compare these to the previous 12-month totals.
- The City will perform inspections of City offices to determine participation rates in the City recycling program, identify problems, and to answer questions.

d. Commercial Recycling Promotion

- The City will mail out the commercial recycling survey annually to monitor private recycling efforts.
- The City will ask MRF operators and landfill operators to submit annual reports detailing the quantity of commercial wastes being diverted from landfills.

4. Contingency Measures

The following measures will be taken if the monitoring program indicates that the diversion goals are not being attained.

- a. The frequency of program review would be increased to provide better tracking capabilities.
- b. A review would be done to determine if additional market outlets are needed to stimulate the flow of recycled materials.
- c. Operating efficiencies of the programs would be reviewed to insure they are at an optimal level (i.e. staffing levels, adequacy of equipment, level of commitment by private contractors, etc.)
- d. All involved parties would be surveyed to determine if they have been educated as to their responsibilities.
- e. The feasibility of creating a financial system of incentives and penalties to increase diversion rates would be examined.
- f. An increase in public education efforts would be undertaken for both the residential and commercial generators.
- g. A review of the diversion goals would be conducted to determine if maximum recovery had been achieved based on wastestream data.

Appendix IV-A

CITY OF SANTA CLARA MUNICIPAL CODE FRANCHISE FEE POLICY

Section 3. PAYMENTS TO CITY

CONTRACTOR shall pay to the CITY, for the privilege of engaging in the business of collecting, hauling, and transporting industrial refuse to its destination, a franchise fee equal to five (5) percent of the total gross billings issued to industrial customers in the City of Santa Clara, including bin and equipment rental charges. City acknowledges that CONTRACTOR also performs work in the City of Santa Clara as a demolition contractor under business license No. 31653. The fee set forth herein shall be based upon the value of off-site hauling performed by Butterick Enterprises on those projects where Butterick Enterprises is not performing demolition services.

The franchise fee shall be eight (8) percent of total gross billings, Franchise fee is reduced to five (5) percent if CONTRACTOR can certify in writing to the CITY at least one of the following conditions is met concerning the refuse collected in the city of Santa Clara:

- a) CONTRACTOR is disposing of refuse collected at a disposal facility which separates and recycles at least ten percent (10%) of the total volume of refuse received from the CONTRACTOR.
- b) CONTRACTOR is disposing of at least twenty percent (20%) of the total volume of refuse collected at a resource recovery facility which reduces the volume of refuse received for disposal by at least twenty five percent (25%).
- c) CONTRACTOR has a designated recycling coordinator program representative who performs on a minimum the following services:
 - 1) Contacts each of the contractor's industrial customers in the city of Santa Clara once every two (2) years to discuss the various types of recycling possibilities available for the customers.
 - 2) CONTRACTOR has the recycling coordinator work with each new customer concerning recycling options.

3) CONTRACTOR has written documentation of contact with customers and recycling options implemented.

d) CONTRACTOR has other type recycling or resource recovery program, which reduces the total volume of refuse being disposed of by at least twenty five percent (25%).

CONTRACTOR shall file with the Director of Finance, for each quarter's (or portion thereof) reporting period, a written statement certifying the total gross billings issued by him during the period and total number of customers for which such statement is rendered and filed. Said statement shall be due within thirty (30) calendar day following the end of each quarter.

Each such statement shall be executed and submitted on a "CERTIFICATE OF GROSS BILLINGS, FRANCHISE FEE PAYMENT, AND NUMBER OF CUSTOMERS" form included herein as EXHIBIT "A".

Appendix IV-B
Evaluation of Recycling Program Alternatives
Table 1

	Expanded Curbside Collection	Multi-Family Recycling	Mobile Collection Systems	Commercial Recycling Promotion	Drop-off Recycling Centers	Buy-back Centers
Reduces quantities of solid waste disposal	3	4	1	3	2	2
Hazard Created	5	5	5	5	5	5
Accommodates Changing Conditions	4	4	5	5	4	5
Merely shifts waste type created	5	5	5	5	5	5
Implementable in short/medium-term planning periods	5	5	5	5	5	5
Requires new/expanded Facilities	4	3	3	5	3	1
Consistent with local plans and ordinances.	5	5	1	5	2	5
Institutional Barriers	5	5	1	5	2	2
Estimated Cost	4	3	4	4	2	1
Availability of End Uses for Diverted Materials	5	5	5	5	5	5
Total Score	45	44	35	47	35	36

Appendix IV-B
Evaluation of Recycling Program Alternatives
Table 2

	Materials Recovery Facility	Landfill Salvaging	Planning and Building Code Modifications	Disposal Fee Modification	Quantity-based User Fees
Reduces quantities of solid waste disposal	3	2	3	3	3
Hazard Created	3	5	5	4	4
Accommodates Changing Conditions	4	5	5	3	5
Merely shifts waste type created	5	5	5	5	5
Implementable in short/medium-term planning periods	1	5	5	3	4
Requires new/expanded Facilities	1	4	5	5	5
Consistent with local plans and ordinances.	1	1	3	2	3
Institutional Barriers	1	1	3	2	3
Estimated Cost	1	3	3	4	3
Availability of end uses for diverted materials	5	5	5	5	5
Total Score	25	36	42	36	40

Appendix IV-B
Evaluation of Recycling Program Alternatives
Table 3

	Weight-based Fee System	Market Development Activities	Handling Methods	City Office Program	Legislative Support
Reduces quantities of solid waste disposal	5	2	1	2	2
Hazard Created	4	5	5	5	5
Accommodates Changing Conditions	5	5	5	5	5
Merely shifts waste type created	5	5	5	5	5
Implementable in short/medium-term planning periods	3	5	5	5	5
Requires new/expanded Facilities	4	5	3	5	5
Consistent with local plans and ordinances.	4	4	1	5	5
Institutional Barriers	3	4	3	5	5
Estimated Cost	2	4	3	5	5
Availability of end uses for diverted materials	5	5	5	5	5
Total Score	39	44	36	47	47

Appendix IV-C

City of Santa Clara diversion assumptions

1990 Diversion Table

1. Residential curbside

These tonnages were provided by the City.

2. Commercial on-site

These tonnages were provided by the City.

3. City offices

These tonnages were provided by the City.

4. Buy-back and 20/20

These tonnages are from the County diversion study by Emcon Associates.

5. Drop-off

These tonnages are from the County diversion study by Emcon Associates.

6. Landfill salvaging

These tonnages are from the County diversion study by Emcon.

1995 Diversion table

1. Overall solid waste generation increases at (1.1% - 0.75%(due to source reduction)), or 0.35% per year for the short-term (1990-1995).

Source: The City estimates that overall solid waste generation will increase at 1.1% per year for the next ten years. RSI assumes that a 0.75% reduction from this rate will occur in the short-term due to source reduction, for a total increase in solid waste generation of 0.35% per year.

2. Tons for the residential curbside program, the buy-back/2020 program, and the drop-off program grow at the same rate as overall waste generation, or 0.35% per year in the short-term.

Source: City estimate.

3. Tons for the new materials added to the residential curbside program are as follows:

Material	1995 tons	Percent of material collected from the residential subwastestream
OCC	781	50%
magazines	355	50%
HDPE	213	50%

Source: RSI estimate.

4. 20 tons per year of mixed paper are added to the drop-off program in 1995 to account for the new phone book recycling program.

Source: Actual 1990 tonnage provided by Mission Trail Waste Systems.

5. Tons for the multi-family program are as follows:

Material	1995 tons	Percent of material collected from the multi-family subwastestream
OCC	920	50%
magazines	943	50%
newspaper	646	75%
HDPE	174	50%
PET	46	50%
glass	303	50%
aluminum	52	75%

Source: RSI estimate

6. The private commercial recycling were estimated by the city.
7. The city offices recycling tons grow by 2% per year due to increased participation in recycling by City employees.
8. The landfill salvaging program is discontinued due to the closure of the All Purpose landfill.
9. Composting tonnages were provided by the City.
10. Diversion from the Recyclery, Richard Avenue and Zanker Road Material Recovery Facilities is shown on the attached chart.
11. Total Tons Landfilled and total MSW columns do not add precisely due to sampling methodology and allocation of inert tonnages in the waste characterization study.

2000 Diversion Table

1. Overall solid waste generation increases at (1.1% - 1.27% (due to source reduction)), or (-0.17%) per year for the medium-term (1995-2000).

Source: The City estimates that overall solid waste generation will increase at 1.15 per year for the next ten years. RSI assumes that a 1.27% reduction from this rate will occur in the short-term due to source reduction, for a total reduction in solid waste generation of (0.17%).

2. Tons for the residential curbside program, the multi-family curbside program, the buy-back/2020 program, and the drop-off program grow at the same rate as overall waste generation, or (-0.17%) in the medium-term.

Source: City estimate

3. The private commercial recycling tons were estimated by the city.
4. The city offices recycling tons grow by 2% per year due to increased participation in recycling by City employees.

Source: RSI estimate

5. 40 tons per year of mixed paper are added to the drop-off program to account for increased telephone book recycling.

Source: RSI estimate

6. Composting tonnages were provided by the City.
7. Diversion from the Recyclery, Richard Avenue and Zanker Road Materials Recovery Facilities is shown on the attached chart.
8. Total Tons Landfilled and Total MSW columns do not add precisely due to sampling methodology and allocation of inert tonnages in the waste characterization study.

City of Santa Clara 1995 MRF Diversion

Richard Ave.				Newby			Zanker		
Material	Tons	% Diversion	Tons Diverted	Tons	% Diversion	Tons Diverted	Tons	% Diversion	Tons Diverted
OCC	10,560	60.00%	6,336	19,709	22.00%	4,336	2,739	80.00%	2,191
Mixed Paper	5,470	60.00%	3,282	10,200	0.50%	51	1,419	80.00%	1,135
Newspaper	1,432	60.00%	859	2,661	5.90%	157	385	0.00%	0
Highgrade Paper	2,577	60.00%	1,546	4,830	4.70%	227	669	80.00%	535
Other Paper	3,817	0.00%	0	5,000	0.02%	1	1,018	0.00%	0
HDPE	1,018	60.00%	611	1,892	0.37%	7	264	80.00%	211
PET	63	60.00%	38	119	0.08%	0	19	80.00%	15
Other Plastics	3,054	0.00%	0	5,672	2.01%	114	821	0.00%	0
CA Redemption	668	60.00%	401	2,083	0.24%	5	180	0.00%	0
Refillable	158	60.00%	95	417	0.24%	1	43	0.00%	0
Other Recyclables	477	60.00%	286	833	0.24%	2	128	0.00%	0
Aluminum Cans	95	60.00%	57	1,429	0.14%	2	26	0.00%	0
Tins Cans	382	60.00%	229	833	0.12%	1	103	0.00%	0
Ferrous	2,958	60.00%	1,775	5,533	1.50%	83	795	0.00%	0
Non-Ferrous	95	0.00%	0	178	0.00%	0	26	0.00%	0
Green Waste	4,771	0.00%	0	1,010	61.50%	621	128	0.00%	0
Wood	5,885	60.00%	3,531	10,972	61.50%	6,748	1,526	80.00%	1,221
Inert Solids	1,985	60.00%	1,191	3,716	0.00%	0	515	80.00%	412
Other	19,312	0.00%	0	41,644	0.85%	293	5,997	0.00%	0
Total	64,777	31.24%	20,237	118,731	10.65%	12,649	16,801	34.05%	5,720

Totals	Tons	Tons Diverted
	200,309	38,606

City of Santa Clara 2000 MRF Diversion

Richard Ave.				Newby			Zanker		
Material	Tons	% Diversion	Tons Diverted	Tons	% Diversion	Tons Diverted	Tons	% Diversion	Tons Diverted
OCC	11,304	65.00%	7,348	19,708	60.00%	11,825	2,625	80.00%	2,100
Mixed Paper	5,856	65.00%	3,807	10,200	30.00%	3,060	1,401	80.00%	1,121
Newspaper	1,532	65.00%	996	2,670	30.00%	801	385	0.00%	0
Highgrade Paper	2,561	65.00%	1,665	4,800	30.00%	1,440	595	80.00%	476
Other Paper	3,817	0.00%	0	5,970	0.02%	1	1,018	0.00%	0
HDPE	1,090	65.00%	708	1,900	30.00%	570	261	80.00%	209
PET	68	65.00%	44	120	30.00%	36	16	80.00%	13
Other Plastics	3,054	0.00%	0	5,672	2.01%	114	821	0.00%	0
CA Redemption	715	65.00%	465	1,983	60.00%	1,190	180	0.00%	0
Refillable	170	65.00%	111	297	60.00%	178	43	0.00%	0
Other Recyclables	511	65.00%	332	890	60.00%	534	128	0.00%	0
Aluminum Cans	102	65.00%	66	178	60.00%	107	26	0.00%	0
Tins Cans	409	65.00%	266	713	30.00%	214	103	0.00%	0
Ferrous	3,167	65.00%	2,058	5,521	0.20%	1,104	795	0.00%	0
Non-Ferrous	95	0.00%	0	178	0.00%	0	26	0.00%	0
Green Waste	4,771	0.00%	0	1,010	61.50%	621	128	0.00%	0
Wood	5,849	65.00%	3,802	10,982	65.00%	7,138	1,522	80.00%	1,218
Inert Solids	1,973	65.00%	1,282	3,716	30.00%	1,115	512	80.00%	410
Other	16,783	0.00%	0	40,588	0.85%	345	5,739	0.00%	0
Total	63,827	35.96%	22,950	117,096	25.96%	30,393	16,324	33.98%	5,547

	Tons	Tons Diverted
Totals	197,247	58,890

Appendix IV-D

City of Santa Clara

Recycling Program Tasks and Completion Schedule

Program	Tasks	Start Date
Expand Curbside Recycling Program	• Secure authority and funding for the program expansion.	1991-92
	• Determine schedule for adding cardboard, magazines and HDPE to single-family dwelling collections (with contractor).	1991-92
	• Estimate quantity of additional materials to be collected from single-family dwellings (with contractor).	1991-92
	• Confirm market specifications and agreements for new materials (with contractor).	1991-92
	• Review and redesign single-family collection routes based on estimates of additional cardboard, magazine and HDPE to be collected (contractor).	1991-92
	• Secure materials markets agreements (e.g. delivery method, degree of separation required, pricing arrangements) for cardboard, magazines and HDPE (contractor).	1991-92
	• Develop "quick-check" cards to leave on buckets. Cards will remind residents about acceptable and unacceptable items, as well as procedures for preparing items.	1991-92
	• Develop promotion and education materials to inform single-family dwellings of additional materials to be collected.	1991-92
	• Coordinate promotion and education schedule (with contractor).	1991-92
	• Distribute materials.	1991-92
	• Initiate service (contractor).	1991-92
	• Evaluate the feasibility of including plastics other than PET and HDPE in the curbside programs.	1994-95
	• Evaluate the feasibility of adding mixed and high-grade paper to the curbside programs.	1994-95
Multi-Family Recycling Program	• Assign or reassign staff to coordinate expansion to multi family dwellings.	1991-92
	• Confirm the number of multi-family dwellings to be served, potential recovery levels, capital and operating costs, and schedule (with contractor).	1991-92

Multi-Family Recycling Program (Cont.)	• Determine schedule for adding cardboard, magazine and HDPE (with contractor).	1992-93
	• Estimate quantity of materials to be collected (with contractor).	1992-93
	• Order vehicles and bins (contractor).	1992-93
	• Design collection routes (contractor).	1992-93
	• Redesign routes to collect additional materials (contractor).	1992-93
	• Secure materials markets agreements (contractor).	1992-93
	• Receive/test recycling vehicles (contractor).	1992-93
	• Receive/distribute recycling bins and promotional information (contractor).	1992-93
	• Develop "quick-check" cards to leave on bins and with property managers. Cards are to remind multi-family residences about acceptable and unacceptable items, as well as procedures for preparing items.	1992-93
	• Coordinate promotion and education schedule (with contractor).	1992-93
	• Distribute materials.	1992-93
	• Initiate service (contractor) to initialize expansion areas.	1992-93
	• Evaluate expansion to additional areas	1992-93
	• Expand to remaining complexes	1995-96
	• Evaluate the feasibility of including plastics other than PET and HDPE in the curbside programs.	1994-95
	• Evaluate the feasibility of adding mixed and high-grade paper to the curbside programs.	1994-95
Legislative Support	• Assign staff person to oversee program	1992-93
	• Subscribe to legislative journals	1992-93
	• Investigate feasibility of using on-line legislative tracking service and coordinate with other jurisdictional organizations to minimize costs.	1992-93
	• Develop an in-house network for reviewing and analyzing solid waste legislation of particular significance to the City.	1993-94
	• Prepare reports to the City Manager and City Council on important legislation.	1993-94

Market Development	<ul style="list-style-type: none"> Survey local materials markets to determine future demand for increased material supply as well as their ability to expand. 	1993-94
	<ul style="list-style-type: none"> Support state and federal legislation that promotes the use of recycled products (e.g. tax credits to companies using secondary materials, procurement preference to suppliers with products that are durable, recycled, reusable or recyclable, setting standards to require that products contain a minimum percentage of recycled material). 	1993-94
	<ul style="list-style-type: none"> Determine local and regional needs for new material markets. 	1993-94
	<ul style="list-style-type: none"> Work with other local governments in the region on economic incentives to attract businesses which use recycled materials new to the area (e.g., economic development projects, tax credits, property tax exemptions, modified zoning and planning requirements). 	1994-95
	<ul style="list-style-type: none"> Survey other cities and states that have adopted successful recycling procurement practices. 	1994-95
	<ul style="list-style-type: none"> Identify procurement regulations that have unnecessary requirements for purchasing products made from virgin materials. 	1994-95
	<ul style="list-style-type: none"> Review purchases made by the City to determine where recycled, recyclable, and durable products could be increased. 	1994-95
	<ul style="list-style-type: none"> Work with product manufacturers and suppliers to determine the availability and price of recycled, recyclable, and durable products. 	1994-95
	<ul style="list-style-type: none"> Determine economic impacts of providing price preferences for recycled, recyclable and durable products. 	1995-96
	<ul style="list-style-type: none"> Make recommendations to the City Council. 	1995-96
City Office Recycling Program Expansion	<ul style="list-style-type: none"> Survey existing system and determine need for additional central collection containers to increase employee convenience. 	1992-93
	<ul style="list-style-type: none"> Evaluate feasibility of adding glass recycling to the program. 	1992-93
	<ul style="list-style-type: none"> Conduct brief education seminars to groups of city employees to review program requirements and changes, and to answer questions. 	1992-93
	<ul style="list-style-type: none"> Distribute updates to employees on regular basis detailing program successes. 	1992-93

Awards and Public Recognition Program	• Design and produce promotional materials.	1991-92
	• Design award plaque.	1991-92
	• Formalize award evaluation criteria.	1991-92
	• Evaluate costs/ benefits of holding separate awards ceremony.	1991-92
Voluntary Submission of Source Reduction and Recycling Plans	• Design and produce announcement of request.	1992-93
	• Develop tracking system for plans submitted.	1992-93
	• Request all businesses and organizations holding business licenses and having offices within the city to submit plans.	1992-93
	• Receive, acknowledge, and review plans submitted.	1992-93
	• Follow-up with businesses to clarify data.	1993-94
	• Enter relevant information into City data base.	1993-94
Evaluate Planning and Building Code Modifications	• The Departments of Public Works and Planning assign staff to review codes.	1991-92
	• City staff work with local architects, planners, building managers, recyclers, waste haulers to review codes.	1991-92
	• City staff to make recommendations for any code change to City Council.	1992-93
	• City Council holds hearings on proposed new ordinances and code changes.	1993-94
	• City Council approves new ordinances and codes.	1994-95
	• Inform public about new code requirements by sending out press releases and holding press conference.	1995-96
	• Produce flyers for distribution at planning and zoning counters.	1995-96
	• Train staff in reviewing plans, notifying about compliance and answering questions.	1995-96
	• Evaluate need for a media event when first large housing or commercial development project receives permit after complying with new codes.	1997-98
Evaluate Feasibility of Quantity-Based User Fees	• Assess potential for illegal dumping, the effectiveness of local illegal dumping laws, including ease of enforcement, and potential clean-up costs if a variable can rate system were enacted by City.	1994-96

	<ul style="list-style-type: none"> • Survey the diversion effectiveness of variable can rates that have been enacted by other jurisdictions, including potential dumping problems and solutions to these problems. 	1995-96
	<ul style="list-style-type: none"> • Prepare cost/benefit analyses on a variable can rate system 	1995-96
	<ul style="list-style-type: none"> • Make recommendations to the City Manager and City Council. 	1995-96
Promote Commercial Recycling	<ul style="list-style-type: none"> • Use media public service announcements to inform the business community about the Santa Clara County Manufacturing Group's <i>Guide to Commercial Recycling</i>. 	1991-92
	<ul style="list-style-type: none"> • Act as a resource center for the business community by setting up a commercial recycling hotline to answer questions. 	1992-93
	<ul style="list-style-type: none"> • Develop a promotional brochure targeted to the business community with information on the many benefits of recycling such as disposal cost savings, revenues from materials sales, and creating a positive public image. 	1992-93
	<ul style="list-style-type: none"> • Create a speaker's bureau and schedule speakers at meetings of various local business organizations such as the Rotary Club. 	1992-93
	<ul style="list-style-type: none"> • Make businesses aware of the City's and the private sector's waste evaluation services. 	1992-93
	<ul style="list-style-type: none"> • Continue to work with the Santa Clara County Manufacturing Group. 	1991-92
	<ul style="list-style-type: none"> • Make businesses aware of self-haul options, including the location of drop-off and buy-back centers, and the local MRFs. 	1992-93
	<ul style="list-style-type: none"> • Expand the number of firms competing for the City's commercial waste reduction award. 	1992-93
	<ul style="list-style-type: none"> • Encourage business to voluntarily submit a commercial source reduction and recycling plan. 	1992-93

Note: Tasks would be started in the first or second quarter and completed by end of the fourth quarter of the fiscal year stated

**Appendix IV-D.1
City of Santa Clara
Recycling Program Costs**

Programs	Capital Costs	Annual Costs
Recycling		
1. Expansion Residential Curbside Recycling Program Materials	\$0	\$0 (1)
2. Expand Multi-Family Residential Recycling Program		
a. Initial Expansion area	0	20,000
b. Citywide total costs remainder	0	180,000
4. Market Development	0	500
5. City Office Recycling Program Expansion	0	500
6. Awards and Public Recognition Program	0	500
7. Voluntary Submission of SRRE By Businesses	0	5,000 (3)
8. Evaluate Feasibility of Quantity-Based User Fees	0	0 (2)
9. Evaluate Feasibility of Quantity-Based Fees	0	0 (2)
10. Promote Commercial Recycling	0	5,000
Total Program Costs	\$0	\$211,500
Notes: 1. Costs currently in existing contractual agreement for curbside recycling program. 2. Costs included in City's General Fund Operating Budget prior to FY 1991-92. 3. Costs included in City's General Fund Operating Budget beginning FY 1991-92.		

CHAPTER V COMPOSTING COMPONENT

Introduction

A well designed and operated composting program can play a major role in the overall success of a solid waste management strategy. As such, composting will be a major contributor to the City of Santa Clara's goals of 25% source reduction and recycling by 1995, and 50% by 2000.

Composting can be defined as the biological degradation of organic matter under controlled conditions to produce a usable soil amendment. The results of the waste disposal characterization analysis indicate that approximately 27% of the City of Santa Clara's municipal solid waste consists of compostable material, therefore, composting has the potential to become a significant means of managing solid waste. This total includes 11 percent yard waste, 8 percent wood waste, and 8 percent food waste.

Reliance on composting as a significant component of a solid waste management plan has several environmental and economic benefits. Economic benefits of composting may include one or more of the following:

- Avoided disposal costs;
- Reduced solid waste processing costs;
- Reduced demand on landfill capacity;
- Delayed need to incur capital costs of new landfill acquisition;
- Reduced expenditure on organic soil amendments.

Potential environmental benefits could include any or all of the following:

- Landfill space savings;
- Conservation of a valuable natural resource;
- Improved soil fertility and enhanced aesthetics through the application of compost;
- Reduced leachate strength from landfills.

Furthermore, legislative impetus toward composting resulting from regulatory bans on the continued landfilling of yard wastes or ambitious landfill diversion goals provides an additional justification for aggressively pursuing composting at this time.

This component of the plan first outlines the short- and medium-term objectives of the composting plan, as well as the status of composting programs currently underway. It then provides a summary of the various composting strategies that will be adopted, and presents a discussion for program evaluation, implementation and monitoring.

It should be noted that a detailed discussion of the technical and procedural guidelines for composting is beyond the scope of this document. More in-depth, technical discussions of composting methods can be found in References 1 to 5 listed in the back of this element.

A. OBJECTIVES

This section describes short- and medium-term objectives for the City of Santa Clara's composting program. The program includes diversion of organic materials both by composting and by other methods of processing (e.g., the production of wood chips for landscaping purposes).

1. Short-Term Objectives

Divert 6% by weight of the total wastestream generated.

- a. Divert, through municipal composting, approximately 17% by weight of the total yard waste generated by the jurisdiction.
- b. Develop the collection and processing infrastructure to deal with the city's source separated yard and wood wastes.
- c. Inform and educate residents about how to participate in the yard waste collection program.
- d. Identify particular sub-groups of potential end users and their anticipated product quality and quantity demands.
- e. Have a yard waste drop-off site at the landfill facility established.
- f. Monitor and evaluate pilot programs for commercial and institutional food and food processing waste collection in anticipation of medium-term food waste composting.
- g. Encourage county and municipal departments to use compost products generated by the program, and inform residents of their availability.
- h. Study the use of yard waste compost for landfill cover.
- i. Study the effect of collection and disposal rates on quality of compostable materials collected.
- j. Encourage, via the source reduction component, residential backyard composting.

2. Medium-Term Objectives

Objectives for the medium-term planning period include:

- a. Divert 10% by weight of the total generated wastestream.
- b. Divert, through composting, approximately 35% by weight of the total quantity of yard waste generated by the jurisdiction.
- c. Refine the yard and wood waste collection and processing systems.
- d. Study food and food processing waste collection and composting.
- e. Study the feasibility of co-composting yard waste with other organic residues.
- f. Divert self-haul yard waste into composting program.
- g. Implement a program to encourage use of compost by parks and highway departments and other public entities.

B. EXISTING CONDITIONS

The results of the disposed waste analysis Chapter II indicate that for the year 1990, disposed yard waste amounted to 11 percent; wood waste, 8 percent, food waste 9 percent, and other compostable materials (not including paper), 0.1 percent. The source of the material was the residential, commercial, industrial, and self-haul sectors. The amount of compostable materials generated by each of the sectors in 1990 was as follows: residential, 10 percent; commercial, 9 percent; and industrial, 10 percent.

Compostable waste materials from the residential, commercial, and industrial sectors in the City of Santa Clara are collected from cans and bins along with other mixed wastes. The City does collect rubbish, mostly yard wastes, separate from garbage from single family residences. The material collected is not recovered at this time, but is landfilled because less than 60% is compostable. The yard waste, wood wastes, and other biodegradable organic materials collected from specific industrial sources are diverted from the landfill as discussed below.

The diversion of compostable wastes in 1990 from industrial and self-haul waste sources is estimated to be 1% (2,500 tons annually). The material categories comprising the diversion are: yard waste (none), wood waste (1%, 2,500 tons annually), food waste (none).

The following program contributes to the diversion:

Zanker Road Landfill wood waste recovery program - an estimated 2,500 tons per year from the City of Santa Clara.

Compostable materials are currently being composted, recycled at the following site:

Name:	Zanker Road Resource Recovery
Location:	San Jose
Method of Processing:	composting, recycling
Quantities Recycled:	2,500 tons annually

C. EVALUATION OF PROGRAM ALTERNATIVES

1. Collection Options

The highest quality compost products are produced from the separate collection of compostable materials. The materials can be collected separately for subsequent processing into usable end-products through curbside collection, a drop-off program, or both. Collection programs should be accompanied by aggressive promotion of source reduction methods, such as home composting. A description of source reduction programs is presented in Section III.

a. Residential Curbside Collection

Important considerations in the curbside collection of yard waste include: identification of the types of yard waste to be collected and the frequency of collection; method of set-out for yard waste; and type of collection vehicle.

The yard waste generated by single-family residences in the City of Santa Clara is estimated to consist of approximately 21% by weight brush and other woody materials, and 79% by weight leaves and grass. The collection system must be capable of handling these materials regularly and efficiently.

The current City (Curbside) Rubbish Collection Program collects these materials, plus other materials such as paper wastes. A major change involving Council approved collection program rules, and resident education would be required to convert this so compostable materials could be collected without contaminants.

There are several options for setting out yard waste in a residential curbside collection program:

- bagged;
- loose yard waste raked into street or to curb;
- designated rigid containers;
- bundled tree trimmings.

Advantages of containerized (versus loose) yard waste set-out include: 1)no significant behavior change is required of residents; and 2)standard existing waste collection vehicles can be used to collect yard waste. Disadvantages include: 1) debagging may be necessary; 2) collection crews may need to lift heavy bags or other containers; and 3) potential contaminants are hidden from view. By contrast, collection of loose yard waste requires no debagging and does not cause collection crew strain from lifting heavy objects. However, collection of loose materials may be more labor-intensive and more costly, may require parking regulations, and may result in residue left on the street.

The inclusion of more highly putrescible types of compostable materials (e.g., food wastes) in the residential curbside collection program necessitates the use of a containerized collection system and a collection frequency of no less than once per week. The quantities and characteristics of the feedstock are important considerations in determining the type of container.

Mixed MSW is being processed at several facilities in the U.S. for composting. The processing methodology varies among the facilities, but typically involves a series of processes such as size reduction, magnetic separation, air classification, and screening. Although the quality of the compost produced from mixed MSW is generally not as good as that produced from source separated compostables (e.g., yard waste), this type of program has the advantage of not requiring that the material be source separated.

b. Commercial Program

A program similar to residential curbside collection would offer multifamily dwellings, business, and civic yard waste generators the opportunity to divert yard waste from the landfill.

The program could also include other wastes that could be composted, such as food wastes and manures. Collection of these materials generally is conducted by using bins ranging in size from 2 to 40 cubic yards or by means of dump trucks.

Food wastes comprise a significant portion of the overall wastestream. If properly managed, co-composting food wastes with yard waste would not introduce serious complications. These wastes have a high moisture content and must be promptly and properly mixed with bulky yard waste. This material will result in a high-quality compost.

For programs using manure as a composting feedstock, proper attention must be given to limiting the manure quantities, minimizing the storage time of food wastes, and maintaining aerobic decomposition to minimize vector attraction and odor. In certain instances, manure may also contain chemicals which are included in feed supplements. It would be prudent to test the manure for undesirable chemical compounds.

Co-composting of yard wastes with sewage sludge is practiced in several operations in the U.S. The introduction of sewage sludge complicates the composting operation. Processing technologies, especially those of the pre-processing and active composting stages, require greater refinement than is necessary in a yard waste only operation. Site construction costs would increase, based on the need for more extensive paving, water runoff collection, and a larger buffer zone. Facility permitting would become a more complex process, due to potential environmental and health impacts that are more severe, or more difficult to mitigate, than those for yard waste composting.

c. Permanent Drop-Off Centers

A drop-off program relies on residents and/or private commercial haulers to transport clean (segregated) yard and wood waste to a designated site. This type of program keeps collection costs low, but generally results in less volume recovered than in a curbside collection program. This is a primary or sole collection method typically used in sparsely populated areas. If population density is sufficiently high, a drop-off program can be supplemented by both a curbside collection and by a backyard composting program, for maximum recovery of yard wastes.

Key planning features for yard and wood waste drop-off sites include the following:

- A drop-off center can be more easily located at a landfill, transfer station, or at a MRF.
- Sites can be open only a few days a week, such as one or two weekdays and on Saturdays, to minimize staff time.
- Sites should only accept source-separated or uncontaminated yard and wood wastes.
- Materials should be delivered in loose form (or in biodegradable paper bags).
- A conveniently-located receptacle should be provided so that residents can dispose of plastic bags or other containers used to transport yard waste to the sites.
- Instructional signs should be placed at sites to indicate acceptable materials, unloading location, and site hours.
- Acceptable materials should include leaves, grass clippings, brush, and branches less than 6 in. in diameter. Stumps and branches over 6 in. in diameter, and construction and demolition wood should not be accepted.
- The tipping fee for commercial haulers and residential self-haul should be set at 25% to 50% less than tipping fees at disposal sites in the region.
- One employee per site should monitor the site during hours of public access for quality control and organization.

d. Mobile Drop-Off Centers

These centers can be established using large collection trailers (approximately 40 cu yd capacity) in neighborhoods for short, scheduled periods of time. When full or when appropriate to be moved to the next neighborhood, trailers are first emptied at a centralized composting or pre-processing aggregation site.

e. Residential On-site Composting

On-site composting can be defined as the process of managed decomposition of organic materials on one's own premises that results in the creation of a usable horticultural product.

On-site composting in residential areas is also known as "home" or "backyard" composting. Yard waste can be composted successfully at home fairly easily with minimal odors or disturbance from animals. Often, yard waste is composted together with food scraps. This works well, provided that the composting is managed properly and that meat by-products are excluded from the compost pile. This approach is generally most suitable for single- or two-family residences which have available space in their backyards.

In the City of Santa Clara source reduction through home composting is encouraged by volume-based (per can) collection programs. Those who engage in composting at home reduce their volume of waste, and consequently reduce their disposal costs. However, the existing rubbish collection program serves as a disincentive to compost because it allows unlimited set-out of rubbish, which includes yard waste, for a minimal cost of \$0.45 per month per residence.

The quantities of yard waste requiring disposal can also be reduced by leaving cut grass on the lawn, although this is technically not considered composting, but source reduction.

According to the regulations, on-site composting is a form of source reduction. Further information on on-site composting is provided in the source reduction component.

2. Compost Processing Options

Three stages of processing can be utilized at composting operations: pre-processing, composting, and post-processing. For source separated compostable materials, pre-processing generally involves shredding and/or screening of the incoming materials to result in a compost feedstock of a particle size that would compost more readily. As discussed earlier, the processing involved for a mixed MSW feedstock is more involved. The composting stage involves the biodegradation of the material and is discussed in the following paragraphs. Size reduction and/or screening are used in the post-processing stage to produce a compost or mulch product with a more consistent particle size.

There are several composting methods, ranging from low to highly complex technology. The most appropriate technology depends upon the composition of the feedstock, the capital and labor requirements, and the existence of suitable markets for the end products. It is likely that a combination of technologies may be the most advantageous. A brief description of available technologies follows:

a. Turned Windrow Method

This method of composting calls for stacking wastes into elongated piles known as windrows. The dimensions of the windrows can be adapted to the particular conditions and available equipment, but in general, they are roughly trapezoidal in cross-section and sized to provide insulation, while avoiding compaction of the material. Satisfying these criteria usually results in windrows from 8 to 15 ft wide, and 5 to 10 ft high, and whatever length is convenient to the site. Aeration is accomplished by agitating or turning the piles using a front-end loader or specially designed turning equipment.

The turning frequency depends on many factors, including the nature of the feedstock, its particle size, moisture content, and the desired rate of decomposition. Generally, but not necessarily, the more frequent the turning, the more rapidly the material decomposes. It is extremely important that site managers monitor temperature, moisture, and oxygen content of the piles to ensure that the materials decompose aerobically and rapidly, without the production of offensive odors. This method of composting generally requires between 6 and 18 weeks to finish.

The major advantages of this method are its ability to process large quantities of materials at a cost competitive with other solid waste disposal options, while producing a marketable and useful product. Turned windrow composting can often be accomplished at existing processing facilities, without very large capital expenditures, and within the stipulated time frame. Potential disadvantages that must be managed are the dedication of relatively large land areas to the project, the possible production of offensive odors, the intensive pile management required to maintain favorable conditions, and the formation of leachate.

b. Aerated Static Pile

This method, also referred to as the forced aeration method of composting, is similar to the turned windrow method, except that oxygen is supplied to the windrows through a network of pipes and blowers that either force or draw air through the composting matter, rather than through turning. However, in practice, it is advisable that some mechanical turning of the piles be carried out to promote complete decomposition and avoid anaerobic pockets. The complexity and expense of this method is generally not justified to compost leaves, grass and other yard wastes. It is appropriate, and commonly used, for stabilization of sewage sludge, and is being applied in dedicated mixed MSW composting projects.

c. In-vessel Composting

This method entails the use of fully or partly enclosed vessels in which decomposition takes place under closely monitored conditions. Its relatively high capital and operating cost makes this method appropriate only for the decomposition of highly putrescible feedstocks, or feedstocks that could be the source of offensive odors such as food wastes. This method of composting is capable of producing a high quality end-product, but its expense makes its unattractive as a primary management option for yard wastes.

d. Size Reduction Of Brush And Wood Waste (shredding and chipping)

This method, although not strictly composting, can be an important and useful element of a yard waste recycling program, or a stand-alone means of handling woody wastes, or both. Small trees, branches, brush, broken pallets, clean used lumber, and other woody waste can be used, after size reduction, either directly as mulch or wood chips, or, if adequately reduced in size, included in compost piles. It is difficult to compost woody wastes without prior size reduction because the relatively high carbon-to-nitrogen ratio slows the decomposition process to impractical time periods. Shredding of woody wastes can generally be implemented in the short-term, with relative ease, and a minimum of uncertainty. No major new facilities should be needed for the operation.

3. Siting Options

In addition to the material presented here, please refer to Section VIII on facility siting. The availability of suitable sites for composting may pose a major barrier to proceeding with operations. Technical, regulatory, economic, political, social, and environmental factors all play a role in the siting process. Potential sites may include:

- a. Unused portions or completed sections of existing landfills and other solid waste facilities such as transfer stations;
- b. Unused portions of wastewater treatment facilities;
- c. Large, unused areas;
- d. Buffer areas around industrial sites and institutions, including airports;
- e. Utility rights-of-way;
- f. Privately owned land;
- g. Municipally owned land used for buffer areas or storage.

Factors to consider when evaluating potential sites are dependent upon local environmental and development regulations, state requirements, and the specific concerns relevant to the proposed site. Generally, factors may include:

- h. Proximity to wastestream;
- i. Proximity to potential markets;
- j. Availability and cost of the site;
- k. Accessibility;
- l. Potential for public acceptance;
- m. Physical condition of site, including topography, geology aesthetics, and other factors;
- n. Availability of utilities;
- o. Current and planned adjacent land use.

The suitability of a given site will, of course, depend on its intended use. As described above, the various factors must be weighed against the proposed option's ability to divert waste.

4. Market Development

Markets will be identified and established for the end-products from the selected composting program. The market plan will identify the end-products and the quality standards. Quality standards are very important in the marketing of end-products.

Local markets such as homeowners, municipal and county agencies, nurseries, sod farms, and landscaping supply firms are examples of potential end users. It will be necessary to determine how the end-products will be distributed (i.e., bagged and/or bulk) and at what, if any, cost.

The plan will also include development of markets outside the immediate area. The City of Santa Clara will explore the possibility of cooperating with other jurisdictions to market end-products. Overseas markets will be explored.

5. Public Information and Education

In order to have a successful composting program, the public will need to be informed as to the benefits of the collection program, the benefits of using compost products, and how to obtain any city-generated compost and other end products. The Public Information and Education Component covers in greater detail the process of educating and informing the public.

Once it has been determined what end-products will be generated, the cost to the public, and how the individual products will be made available, then a separate information program will be developed and implemented. This will be an important aspect of the overall composting component because the city must be able to dispose of the finished products.

6. Evaluation of Rates

In order to improve the overall quality of end-products, the city, during its annual review of rates, will study the effect of rates on assuring high-quality compost products. It may be more cost-effective to have source-separated yard waste or other compostable feedstocks. This would allow for improved quality of end-products. Adjustment to certain rates (e.g., variable-rate residential collection, reduced rates for clean self-haul loads) might encourage this.

7. Evaluation of Collection Alternatives

a. Residential Curbside Collection

Advantages of curbside collection, over drop-off programs, for yard waste or other compostables include: 1) convenience for residents; 2) high community profile and awareness; 3) high participation and recovery rates; and 4) linkage with mixed waste collection.

Disadvantages of curbside collection for yard waste or other compostables include: 1) higher cost; 2) greater complexity; and 3) complaints from residents concerning the modification of an existing program which would also increase the amount of waste that would be disposed through their garbage collection program, therefore increasing their payments.

Residential yard waste comprises a significant portion of the overall wastestream. Diversion of any part of this wastestream will result in the reduction of solid waste going to landfills.

Cost of curbside collection of yard wastes is \$60-\$80 per ton depending upon containerization of yard wastes and collection method.

b. Commercial Collection

Compostable materials generated by the commercial/industrial sector include yard waste, wood waste, and food waste. The advantages and disadvantages for segregated collection of mixed compostable waste from commercial and industrial generators are similar to those outlined under the evaluation of alternatives for residential curbside collection.

In addition to the considerations mentioned previously, separate or commingled compostables collection of food waste may require the use of specialized collection equipment. The collection of food waste will also require changes in the way employees handle food waste disposal in restaurants and at other locations generating substantial quantities of food wastes. The local health department may place requirements on generators of food wastes participating in the food waste collection program with respect to the on-site storage of food waste.

c. Permanent Drop-off Centers

A permanent drop-off program requires a minimal amount of financial investment and staff time, and can be implemented relatively quickly. Yard waste and wood wastes are self-hauled by small private haulers or individual residents to either the composting site or to a local drop-off center. It is anticipated that a drop-off site could be established at the landfill and/or transfer station, and perhaps elsewhere, without the need to build new facilities. Site development costs are usually low. A materials recovery facility would also be a good location for a drop-off center.

To encourage self-haul, residents should be allowed to use the drop-off site at no or minimal cost, and could be given a voucher for finished compost or wood chips. Self-hauling reduces overall costs of collection.

Materials included in such a drop-off program could be limited to bulk leaves if specialized composting equipment (e.g. shredder) is not yet available for use at the composting facility.

d. Mobile Drop-Off Centers

Mobile Drop-Off Centers, using large collection trailers in neighborhoods for short, scheduled periods of time, can be an attractive alternative, particularly in areas with lower population densities or dispersed quantities of compostable materials. The cost generally ranges between that associated with curbside collection and permanent drop-off programs. Participation may need to be limited to residential generators to prevent commercial self-haulers from overwhelming the facilities.

In more rural areas, where residential users self-haul yard and wood wastes, the convenience of not having to transport to the landfill or transfer station will increase participation and increase diversion of materials.

Some disadvantages are: 1) participation will be less than that of a curbside program; 2) location of centers might require changes in zoning ordinances; 3) the center would need to be staffed to prevent unauthorized disposal of unacceptable materials; and 4) additional equipment will be needed for collection and transportation.

e. Residential On-site Composting

Backyard composting can be an inexpensive yard waste management alternative. It eliminates the public and private costs of collection, transport, tipping, and processing. Stopping the flow of materials before they become waste products that require outside handling is gaining recognition as a viable yard waste management option.

However, if backyard composting piles are not properly managed, they can emit unpleasant odors, attract insects and small animals, and become a nuisance to the neighborhood.

One way to stimulate interest in residential on-site composting and promote proper management is through public education and publicity. Backyard composting can be encouraged on more than a strictly economic basis. The values of exercise, recreation, workmanship, science education, and community pride can be identified with home composting.

Refer to the source reduction component for additional information.

8. Evaluation of Processing Options

a. Turned Windrows

Turned windrow composting has minimal associated hazards; odors from poor site or process management is the most frequently mentioned concern. Other hazards, such as flow of runoff into surface water, generally can be controlled effectively with simple steps.

This method of composting can accommodate changing economic, technological, and social conditions rapidly and effectively. Turned windrow composting can be implemented in a short time frame, partly since site improvements are usually minor and new facilities usually need not be constructed. This approach supports local source reduction and recycling efforts, and can be effectively developed by existing local institutions. Turned windrow composting is preferred over other methods for composting yard waste.

One common approach is to utilize a front-end loader to form and turn windrows. Alternatively, specialized equipment (e.g., a windrow turner) can be used to turn and aerate piles effectively and rapidly. Rudimentary operations tend to cost \$10 to \$20/ton (amortized capital and operating expenses), while sophisticated operations often cost approximately \$30 to \$40/ton. The cost of many operations nationwide is between these extremes.

b. Aerated Static Pile

Composting of strictly yard waste via the aerated static pile method is rare. Expense and needless complexity render this method generally inapplicable to yard waste. Aerated static piles are more commonly used to compost sewage sludge.

Aerated static pile composting has minimal associated hazards; odors from poor site or process management is the most frequently mentioned concern. Other potential hazards, such as build-up of ammonia gas in indoor facilities, generally can be controlled effectively by adequate ventilation and process monitoring.

The static pile method can accommodate changing economic, technological, and social conditions relatively quickly and effectively, and does not interfere with or impede progress toward the State's waste reduction and recycling goals. A program using this method can be implemented in an intermediate time frame; construction of a new facility is usually needed. Institutional barriers to its development are few.

Given the same feedstock, static and turned windrows produce identical products if both operations are managed correctly.

Typical combined capital and processing costs for a 10,000 ton/year facility are approximately \$25 to \$50/ton.

c. In-Vessel Composting

Advantages of this method include rapid processing, avoidance of weather-related problems and inefficiencies, and more complete process and odor control. High capital costs and potential for system failure render this option not viable unless more than yard and wood wastes are composted and a rapid throughput time is employed. This technology cannot be implemented in the short-term, and is not particularly flexible in response to changing economic, technological, and social circumstances. Construction of a new facility is essential to support program implementation.

This approach may impede progress toward the State's waste reduction and recycling goals, since it cannot be implemented in the short-term. In addition, institutional barriers may be significant, unless the facility is operated privately.

Typical combined capital and processing costs for a 10,000 ton/year facility are approximately \$40 to \$60/ton.

d. Brush and Wood Waste Processing

Shredding or grinding of woody yard waste supports local source reduction and recycling efforts, and can be implemented in the short-term with relative ease and a low level of uncertainty. However, finished products that are sold as fuel cannot be counted towards the state's 25% diversion goal in 1995. They can be counted for up to 10% of the state's 50% diversion goal in 2000. Debris bins are set out to be filled with wood wastes (pallets, lumber, etc.) at industrial sites, then collected and processed.

The processing technology can be adapted to adjust to technological, social, and economic conditions. Hazards from flying projectiles can be minimized by locating the size reduction processing site at least 300 ft from public access. No new facilities would be required for the operation, although a covered structure for the equipment would be desirable.

Suitable grinders, both mobile and stationary, can process approximately 5 to 10 tons/hour. Regular maintenance and unplanned downtime for certain types of grinders can be significant.

Amortized capital costs (excluding labor and other operating costs) generally translate into a cost of approximately \$10 to \$20/ton for a 10,000 ton/year operation.

e. Evaluation of Siting Alternatives

A privately-owned and -operated (or publicly-owned and privately-operated) processing site has several advantages, including:

- reduced allocation of staff and equipment by public sector;
- no public sector need to identify and develop composting facility (if privately-owned);

- contractually fixed or per unit fee for processing services;
- private responsibility for marketing of end-products;
- better control over operating costs (if publicly owned).

Disadvantages of this option include:

- limited public sector control over end-product outlets;
- possibly greater transport time and cost from collection point to processing location (if privately-owned and located in another jurisdiction).

9. CEQA Requirements

As a component of the overall SRRE, the selected composting program(s) will require an environmental review under the California Environmental Quality Act (CEQA). The environmental impacts of both collection and processing systems would require analysis. Depending upon the quantity and types of materials collected and processed, and the magnitude of potential environmental impacts, a negative declaration or an environmental impact report (EIR) would be prepared.

10. Distribution and Marketing

Distribution and marketing of the end-products of the composting program is the critical link in a successful plan. Most programs will produce one or more of the following products for distribution and marketing:

Compost: used primarily as a soil conditioner, secondarily as a minor source of macro and micro nutrients, to aid in the ability of soil to retain water, and as an ingredient in commercial top soil and potting soil blends;

Mulch: used to retard weed growth, lessen water loss, and stabilize soil temperature;

Wood Chips: serves as a mulch or top dressing, a bulking agent for sludge composting, and as a boiler fuel.

In general, the markets for mulch and wood chips are well developed and predictable. However, compost markets are less mature, and considerable effort should be put into ensuring a reliable outlet for any compost product, prior to program implementation. This program will first determine the specifications of the various materials that will be produced. This will be followed by the identification of the potential end-users for these products. The quality of the feedstock, the degree of source separation, and the processing methods ultimately selected will determine the quality and quantity of the different materials that will be produced, and therefore, the likely markets for them.

Quality constraints associated with compost can include:

- Maturity - material has not fully decomposed;
- Contaminants - presence of sticks, stones, plastic, metals, etc.;
- Low nutrient content - lack of value as fertilizer;
- Heterogeneity - lack of consistent, appropriate particle size;
- Soluble salts and improper pH - can limit use in nursery/potting mixes;
- Unappealing appearance - can limit acceptability.

Compost quality (good appearance, low concentrations of metals and toxic compounds, etc.) will be assured by thorough source separation, careful processing of the feedstock, and regular testing of the end-product. Although a high quality product generally assures more successful marketing, knowledge of the end-users will allow the production of a material of appropriate quality for its intended use. It is possible that the program may lead to the production of two types of composts having different quality. For example, nurseries demand a very high quality product, while highway departments can utilize a lower quality, less expensive product.

The following are potential end-users of compost products in Santa Clara County:

- local parks and highway departments;
- homeowners;
- greenhouses;
- landscapers;
- farmers and farm suppliers;
- golf courses;
- sod growers;
- cemeteries;
- schools;
- parks;
- public buildings.

If supply exceeds demand, public users of soil amendments can be mandated to give preferential treatment to compost products. The municipality will also consider giving the product away free to homeowners and landscapers willing to pick it up.

PRIORITY MATRIX EVALUATION OF ALTERNATIVES

This sub-section identifies and evaluates potential composting programs for the City of Santa Clara.

Each alternative is evaluated according to the following criteria as required by AB 939 regulations:

- a. Effectiveness of the alternative in reducing solid waste volume, weight, or percentage.
- b. Hazard created by the alternative.
- c. Ability to accommodate changing economic, technological, and social conditions.
- d. Consequences of the diversion alternative on the characterized waste. Will it merely shift one type of solid waste to another (i.e., switching from styrofoam coffee cups to paper coffee cups)?
- e. Can the alternative be implemented in the short- and medium-term planning periods?
- f. Is there a need to expand existing facilities or build new facilities to support implementation of the alternative?
- g. Consistency of the alternative with applicable local policies, plans, and ordinances.
- h. Institutional barriers to local implementation of each alternative.
- i. Estimated cost of implementing the alternative.
- j. Availability of local, regional, state, national and international end uses for the material which would be diverted through implementation of the alternative.

An evaluation matrix for each alternative has been prepared. Points were assigned for each evaluation criterion on a scale of 1-5. A low number of points means the alternative scores poorly on the listed criterion. A large number of points indicates it scores high on that criterion. For example, a program to collect compostable materials in a curbside collection program could be fairly expensive to implement so it receives a low score in the Cost of Program category. However, it would divert a large amount of material from the wastestream, so it receives a high score for the amount of Material to be Diverted. If a criterion is not applicable to the alternative, it receives a high score to make scoring categories for all criteria consistent. The number of points assigned for each criterion depends upon how effective and feasible the alternative is for the specific conditions in the City of Santa Clara.

Programs with a score of 43 points or higher were selected for implementation. Programs with a score of 40-42 points were selected for further evaluation. Programs with less than 40 points were not selected.

The evaluation matrices for the City's alternative composting program alternatives are presented in Table V-A and V-B. Actual selection would be made by the operator of the operator of the facility.

Table V-A

Evaluation of Compost Collection Alternatives

Evaluation Criteria	Residential Curbside Collection	Commercial Program	Permanent Drop-off Center	Mobile Drop-off Centers	Residential On-site Composting
Effectiveness	5	5	3	3	2
Hazard	5	5	4	3	3
Ability to Accommodate Change	5	5	3	4	3
Consequences to the Wastestream	5	4	3	3	3
Implementation Period	4	3	4	4	4
Facility Requirements	5	2	4	3	5
Consistency with Local Plans and Policies	3	2	3	3	5
Institutional Barriers	3	2	4	3	5
Estimated Cost	3	1	4	3	5
End Uses	4	4	4	4	5
Public/Private	3	2	3	3	5
Total	45	35	39	36	45

Scoring: 5 = Highest Criteria
1 = Lowest Criteria

Table V-B

Evaluation of Compost Processing Alternatives

Evaluation Criteria	Windrow Composting Program	Aerated Static Pile	In-vessel Composting	Brush/Wood Waste Chipping
Effectiveness	4	4	4	4
Hazard	4	4	3	4
Ability to Accommodate Change	4	4	1	4
Consequences to the Wastestream	4	4	3	4
Implementation Period	4	3	3	5
Facility Requirements	3	3	3	3
Consistency with Local Plans and Policies	3	3	3	4
Institutional Barriers	3	4	3	3
Estimated Cost	3	1	1	5
End Uses	5	5	5	2
Public/Private	4	3	3	5
Total	41	38	32	43

Scoring: 5 = Highest Criteria
1 = Lowest Criteria

D. PROGRAM SELECTION

1. Short-Term

In order to meet short-term goals, an estimated diversion of 6% (by weight) of the total generated wastestream will be necessary. The programs to achieve this goal are:

- a. Modify the City of Santa Clara's Rubbish Collection Program so residential curbside yard and wood waste could be collected on alternating weeks with the materials going to a composting facility and/or other processing facility. This program would result in a 2% (5,000 tons annually) diversion of the total generated wastestream for compost. Selection is based on ease of implementation and on cost-effectiveness.
- b. Encourage landfill operators to develop or expand a drop-off and sorting program for yard and wood wastes processing at a landfill or other existing site. The program is estimated to divert approximately 2% (5,000 tons annually) from the total generated wastestream for compost.
- c. Encourage, if necessary, a regional compost processing facility (centralized if possible).
- d. Encourage a marketing program for the distribution of end-products. Compost, mulch, and wood chips will be marketed as horticultural products. Some wood chips could be marketed as a fuel in order to provide financial stability and flexibility to the program. A successful marketing program could increase revenues to offset costs.
- e. Disseminate public education and publicity materials regarding yard and wood waste drop-off and curbside collection programs, home composting, and other yard waste reduction strategies. Refer to the Education and Public Information Component. The success of the program depends, to a great extent, upon how successfully the public is informed and educated.

2. Medium-Term

For the medium-term, an estimated diversion rate of 7% of the total generated wastestream will be necessary. The programs to achieve this goal are:

- a. Optimize the residential curbside yard and wood waste collection component of the rubbish collection program. The program goal is a diversion of 3% (7,800 tons annually) of the total generated wastestream. An estimated 85% diversion of residential yard waste will be needed to meet the overall diversion goal. The program is an ongoing one, and therefore any incremental costs associated with operating the program should be minimal. The educational programs will also have to be continued.
- b. Study the feasibility of a commercial program that will focus on the separate collection of food wastes. Restaurants and other large generators of food wastes will be targeted.
- c. Study the effect of collection rates on assuring high-quality compost products. Production of high-quality end-products is essential in marketing and the generation of revenues. Rate adjustments for those who source separate yard waste or other compostable waste, and divert high quality compostable feedstocks will have a positive impact on the overall goal of producing quality end-products.
- d. Encourage the continuation of a drop-off and sorting program at various locations (MRF, transfer stations, landfills). This program will focus on self-haulers. The program is estimated to divert 4% (11,000 tons annually) from the total generated wastestream. In order to meet this diversion, an estimated 43% of the non-residential yard and wood waste will require diversion. Materials should be delivered in loose form. Acceptable materials should include leaves, grass clippings, brush, pallets, lumber, and branches less than 6 in. in diameter.

E. PROGRAM IMPLEMENTATION

1. Cost of Programs

The following costs are planning level estimates, developed for comparison only. The estimates are based on a number of broad assumptions. The actual costs may vary depending on the individual requirements of specific sites and engineering design.

It is estimated that, over the short-term, the selected programs will cost initially \$500 in fiscal year ending 1992 to \$5,500 in fiscal year ending 1995 (see Table V-D). It is anticipated that some communities may be able to share both facilities as well as administrative costs.

2. Program Implementation Schedule, Tasks, and Responsible Parties

This section identifies the division of responsibilities between government agencies, program tasks, and timeline. Table V-C outlines implementation. Table V-D outlines estimated materials diversion quantities and rates.

Table V-C
Composting Implementation Plan

Task	Responsible Party	Implementation Date
SHORT-TERM		
Encourage landfill operators to develop wood waste and yard waste drop-off sites	Landfill Operators	FY 1993-1994
Encourage regional compost facilities	Private and Landfill Operators	FY 1991-1992
Implement public education program about yard and wood waste drop-off	City of Santa Clara	FY 1991-1992
Encourage compost marketing programs	Private	FY 1992-1993
Convert residential rubbish collection program to collect yard waste separately (bi-weekly)	City of Santa Clara	FY 1993-1994
MEDIUM-TERM		
Encourage the use of drop-off centers	City of Santa Clara, Landfill Operators	FY 1995-1996
Optimize residential yard waste collection program	City of Santa Clara	FY 1996-1997
Study feasibility of: a) commercial food waste collection b) collection rate impacts	City of Santa Clara	FY 1996-1997
Note: Tasks to start first quarter of FY noted and be completed by end of FY noted.		

Table V-D
Composting Program Plan Tasks, Diversion Quantities, and Rates

Program Plan Tasks		Diversion, Yard & Wood Wastes Estimate by Fiscal Year Ending (Tonnage, % of Total Wastes, Cost Estimates)				
		1992	1993	1994	1995	2000
1. Encourage Landfill Operators to Est. Drop-Off and Materials Recovery Facilities for Yard and Wood Wastes	Tons: Cost:	2,500 (Costs to "encourage" included in item 4 below)	5,000	5,000	5,000	11,000
2. Encourage Regional Composting Facilities	Tons: Cost:	(Tonnage estimates included in item 1) (Costs to "encourage" included in item 4 below)				
3. Residential Yard Waste Collection with Rubbish Collection Program	Tons: Cost:	0 \$0	0 \$0	5,000 \$0 **	5,000 \$0 **	7,800 \$0 **
4. Support Programs (Costs only; tonnages included in items above)						
a. Marketing (on-going)	Cost:	\$250	\$250	\$500	\$500	\$500
b. Public Education (on-going)	Cost:	\$250	\$250	\$5,000	\$5,000	\$5,000
c. Feasibility Studies	Cost:	\$0	\$0	\$0	\$20,000	\$0
5. Total Tonnage Composted	Tons:	2,500	5,000	10,000	10,000 *	18,800 *
6. Total Cost	Cost:	\$500	\$500	\$5,500	\$5,500	\$5,500
7. % of Total Yard and Wood Wastes Tonnage Generated		4.9%	9.9%	19.7%	19.7%	37.5%
8. % of Total Wastestream Diverted (composting only)		1.0%	1.9%	3.5%	3.5%	6.7%

Note: * These tonnages included in Chapter IV, Tables 3 and 4, pages IV-33 and IV-34

** No additional costs over those budgeted for FY 92-93

F. MONITORING & EVALUATION

To ensure that the composting program is meeting its goals and objectives, the program will be monitored and evaluated on a regular basis. Monitoring will include the following measures:

1. recording at the processing site of the estimated volume (cubic yards) or weight (tons) of materials accepted for processing at the composting site, on a daily basis;
2. recording at the processing site of the estimated volume or weight of reject materials that require disposal after pre- or post-processing, on an as-applicable basis;
3. recording by the hauler of the estimated volume or weight of materials collected and accepted at the composting site, on a daily basis;
4. other supplementary measures as deemed necessary or desirable.

A waste generation study will be undertaken by the City of Santa Clara at a time agreed upon by the State to evaluate changes in the disposal levels of materials targeted or that could be targeted by the composting program. Data gathered in the waste generation study will be compared with data gathered in a similar study conducted for the City of Santa Clara in 1990-91.

The effectiveness of the composting program (including on-site composting and other organic waste reduction techniques), combined with the diversion amount for other programs targeting yard and wood wastes, will be gauged in the medium-term as follows, subject to modification in accordance with State guidelines:

1. less than 25% diversion of yard and wood waste, unsatisfactory;
2. between 25% and 50% diversion of yard and wood waste, needs improvement;
3. between 50% and 75% diversion of yard and wood waste, satisfactory;
4. greater than 75% of yard and wood waste, effective.

If it is determined that projected diversion rates will not be obtained, the community has several alternatives available. An evaluation of all selected programs might show the need for increased public information and educational materials. The City of Santa Clara will look at potential measures to increase compost program efficiency, develop strategies for securing additional markets for finished compost products, and determine whether or not to increase diversion of certain compostable materials.

If it is determined that the anticipated diversion rates cannot be achieved, the community will increase diversion rates in one or more of the other components.

REFERENCES

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3. U.S. Congress, Office of Technology Assessment, Facing America's Trash: What Next for Municipal Solid Waste?, OTA-0-424, U.S. Government Printing Office, Washington, D.C., October 1989.
4. Cal Recovery Systems, Inc., Manual for Composting Yard Wastes and Mixed MSW, Prepared for U.S. Environmental Protection Agency, Draft August 1990.
5. Richard T.L., N.M. Dickson, and S.J. Rowland, Yard Waste Management: A Planning Guide for New York State, New York State Department of Environmental Conservation, Albany, June 1990.

CHAPTER VI SPECIAL WASTE COMPONENT

INTRODUCTION

Special waste is solid waste that requires unique handling and disposal methods because of health hazard, environmental impact, or physical characteristics. Special waste is defined in Section 18720, Article 3, Chapter 9, Title 14, California Code of Regulations (CCR).

As defined in Section 18720, special waste is any hazardous waste listed in Section 66740 of Title 22 of the CCR, or any waste that has been classified as a special waste pursuant to Section 66744 of Title 22 of the CCR, or "has been granted a variance for the purpose of storage, transportation, treatment, or disposal by the Department of Health Services pursuant to Section 66310 of Title 22 of the CCR. Special waste also includes any solid waste which, because of its source of generation, physical, chemical or biological characteristics or unique disposal practices, is specifically conditioned in a solid waste facilities permit for handling and/or disposal."

A. TYPICAL SPECIAL WASTES

1. Typical special waste types include:

- Sewage sludge
- Ash
- Asbestos
- Used tires
- "White goods"
- Abandoned vehicles
- Dead animals

2. Presented below is a brief description of typical special wastes.

a. Sewage sludge is produced by wastewater treatment plants during secondary treatment of wastewater. In areas where wastewater systems service industrial areas, sludge may contain heavy metals and other constituents that can pose hazards to public health. Disposal of sewage sludge in solid waste landfills is becoming more difficult because of stricter landfill regulations.

b. Ash is generated from the combustion of solid waste, such as wood waste and sewage sludge. Ash can be disposed of at a Class III landfill unless the Department of Health Services determines that the waste must be managed at a hazardous waste facility and is listed as a permitted waste in the landfill's Solid Waste Facility Permit issued by the CIWMB. Because concentrations of metals in ash commonly exceed levels set by the California Department of Toxic Substances Control (DTSC) is considered to be a California Hazardous Waste and must be managed by a hazardous waste facility. However, the primary means of ash management in the United States is land disposal.

c. Asbestos is a naturally-occurring fibrous substance that has been shown to cause lung cancer and other respiratory problems. Before 1970, asbestos was in widespread use in products such as ceiling and floor tiles, and insulation for pipes, boilers, and ducts. Asbestos is generally classified as friable (hazardous) or non-friable (nonhazardous). Friable, or airborne asbestos is known to have adverse effects on the human lung and poses a potential public health risk when inhaled. It becomes available for inhalation when the material is disturbed in processes such as building repair or maintenance. Friable asbestos in the wastestream is considered a hazardous waste and requires special handling and disposal in a landfill permitted to accept hazardous wastes.

In accordance with Sections 2520 and 2522 of Sub-chapter 15, Title 23, Chapter 3, non-friable asbestos can be disposed of in a Class III landfill provided the facility has waste discharge requirements permitting the disposal of asbestos.

Since asbestos poses a potential risk to public health, it is not possible to recycle or divert it from landfill disposal; therefore, the only alternative to consider in managing asbestos is disposal in accordance with all pertinent local, state, and federal regulations.

d. Used tires pose special handling and disposal problems because of potential environmental and public health impacts. For example, stockpiled used tires can collect rainwater and serve as breeding grounds for disease vectors; they can also pose a fire hazard. Tires disposed of in a landfill tend to "float" to the surface, thereby interrupting landfill cover. They can cause differential landfill settlement if concentrated in one area in the landfill. Nevertheless, in compliance with current regulations, tires are considered non-putrescible waste and therefore can be accepted at Class III or unclassified landfills.

Generally, used tires are either disposed of, or are diverted to a tire recycler for one or several uses, including re-use, tire-derived products, or tire-derived fuel.

e. "White goods" are large appliances (such as washers, dryers, and refrigerators) that have entered the wastestream. White goods have special handling requirements because of their sheer size and weight; in addition, they may contain polychlorinated biphenyls (PCBs) and chlorofluorocarbons (CFCs). PCBs are a known human carcinogen, and CFCs have been shown to break down the

stratospheric ozone layer.

The electrical capacitors and cooling units in these appliances should be removed before the white goods are placed in a landfill. White goods must be thoroughly crushed before burial to avoid refuse bridging, which can cause uneven compaction of the refuse fill. If the electrical capacitors and cooling units are not removed before crushing, PCBs and CFCs could be released into the environment.

Generally white goods are managed by a combination of source reduction (repair, reuse), recycling, and disposal.

f. Abandoned vehicles (under California regulations), are considered to be an unclassified waste, thus qualifying for disposal in a Class III landfill. Disposal is only allowed if listed as a permitted waste on the landfill's Solid Waste Facility Permit issued by the CIWMB.

g. Dead animal collection and disposal are generally managed at a County level under the authority of the Animal Control Department of the Santa Clara County Public Services Agency. Owners are responsible for the disposal of their pets; however, the Department will collect and dispose of the animal for a fee. State agencies are responsible for dead animals found on highways or state property.

Many landfills are normally permitted to accept small animals for disposal; generally, large animals should be taken to a renderer.

B. HANDLING METHODS FOR DISPOSAL

Special waste requires specific handling methods for disposal; these are enforced by the Regional Water Quality Control Board, the Local Enforcement Agency, and the California Integrated Waste Management Board. Summarized below are common handling requirements for the disposal of special wastes.

a. Sewage Sludge

Water treatment sludge can be discharged at a Class III landfill under the following conditions, unless the DTSC determines that the waste must be managed as a hazardous waste: (1) the landfill is equipped with a leachate collection and removal system; (2) the sludge contains at least 20 percent solids if primary sludge (or at least 15 percent solids if it is secondary sludge); and (3) a minimum solids-to-liquid ratio of 5:1 by weight is maintained. The site's Solid Waste Facility Permit approved by the CIWMB must also include this as a permitted waste for disposal.

b. Ash

Ash may be landfilled at a Class III facility unless the DTSC determines that the ash must be managed as a hazardous waste.

c. Asbestos

Friable asbestos-containing waste must be managed as a hazardous waste. Non-friable (nonhazardous) asbestos can be disposed of at a Class III landfill, provided that certain handling requirements are adhered to and the facility is properly permitted. Handling requirements include a dedicated disposal area away from the normal tipping area, and immediate entombment upon receipt of the waste.

d. Used Tires

Tires accepted for disposal should be placed flat at the base of the active face in order to inhibit the tendency of tires in landfills to float to the surface. To prevent differential settlement, tires should not be buried in high concentrations in one area of the landfill. Tires can also be shredded before being landfilled in order to make burial less problematic.

e. White Goods

White goods accepted for disposal at a Class III landfill should be placed in the lower portion of the advancing lift, separated to prevent bridging of the surrounding refuse, and thoroughly crushed by compacting equipment. Electrical capacitors and cooling units should be removed from the units before placement of the white goods in the landfill. These components are removed to prevent the potential release of PCBs and CFCs when the wastes are crushed.

f. Abandoned Vehicles

No landfills in Santa Clara County are permitted to accept abandoned vehicles. Abandoned vehicles pose the same disposal problems as other large bulky items such as white goods and should be handled accordingly.

g. Dead Animals

Generally, large dead animals should be taken to a renderer. Small dead animals can be disposed of at the active tipping area of the landfill. Large quantities of small dead animals should be disposed of at the base of the active face and covered immediately with soil.

C. OBJECTIVES

The special waste objectives presented in this section have been developed to meet the goal of reducing the amount of solid waste generated in the City of Santa Clara. These objectives are to be implemented in the short-term planning period (1991-1995) and continued during the medium-term planning period (1996-2000). The City of Santa Clara can expect to divert less than 1 percent of the total wastestream by implementing the following objectives:

- reduce the hazard potential of dead animals and asbestos;
- continue existing programs that divert recyclable special waste from landfilling, including programs for tires, abandoned vehicles, dead animals, and white goods;
- continue to provide for environmentally safe management or disposal of special waste that cannot be recycled. In the City of Santa Clara, these wastes include dead animals and asbestos.
- increase the recovery of recyclable special waste from the solid wastestream.

Target waste types for special waste have been identified, based on three factors: (1) the results of solid waste generation studies; (2) the effectiveness of meeting the special waste objectives; and (3) criteria that include the volume and weight of the material, the hazard created by the material, the percent content of non-renewable resources, the durability of the material, and the recyclability of the material. These target waste types are:

- asbestos *
- abandoned vehicles *
- tires
- dead animals *
- white goods

(* Note: Not currently permitted for disposal at All Purpose Landfill)

Alternatives for diverting the targeted special waste types from landfilling (as well as alternatives for managing by collecting, treating, and disposing of the targeted special waste types listed) are evaluated below in the section entitled "Evaluation of Alternatives" according to their effectiveness in meeting the special waste objectives.

D. EXISTING CONDITIONS DESCRIPTION

1. Summary of Wastes Diverted

This section describes existing special waste diversion and management activities and programs in the City of Santa Clara. The jurisdiction has carefully reviewed and documented all potential and ongoing special waste efforts, including all the City of Santa Clara programs. The existing special waste diversion rate is estimated to be 0.0 percent of the current total wastestream due to the current SRRE "counting" requirements.

a. Sewage Sludge

The San Jose/Santa Clara Wastewater Plant treats wastewater from San Jose, Santa Clara, Milpitas, Monte Sereno, Campbell, Los Gatos, and Saratoga, and from surrounding unincorporated areas. The plant performs primary, secondary, and tertiary treatment of water. Sludge is spread over 640 acres of lagoons, producing 110 dry-tons of sludge per day. Dried sludge is stockpiled and tested for agriculture, physical, and chemical parameters.

b. Asbestos

Friable asbestos is defined by Bay Area Air Quality Management District regulations as "any material that contains more than one percent asbestos by weight and that can be crumbled, pulverized, or reduced to powder, when dry, by hand pressure."

Because of the recognized health risk, manufacture and use of asbestos products have rapidly decreased in recent years. However, much of the material is still present in residential, commercial, and industrial buildings and must be removed, encapsulated, and properly disposed.

According to the California Department of Health Service's Hazardous Materials Report Manifest Information System, 2,866.8 tons of friable asbestos-containing waste was generated in Santa Clara County during 1987. Of that amount, 7.7 tons was handled by three local companies (Solvent Services, HazControl, and IBM) who shipped the waste to other disposal facilities out of the county. The remaining wastes were shipped directly to out-of-county facilities. None of the asbestos-containing waste was disposed of in this county. See Table VI-A for a list of California counties which received asbestos-containing wastes from Santa Clara County generators.

According to state regulations, asbestos may be disposed in Class III landfills provided wastes are properly contained and appropriate disposal precautions are taken at the landfill site. Within the Santa Clara and San Jose areas, two landfills will accept non-friable asbestos-containing wastes for disposal: Guadalupe Landfill and Zanker Road Landfill.

Table VI-A

Disposal of Asbestos Wastes Generated
In Santa Clara County During 1987

County Receiving Asbestos Waste	Amount Shipped
Alameda	1.68 tons
Contra Costa	416.01 tons
El Dorado	0.45 tons
Kings	127.28 tons
San Joaquin	58.98 tons
Santa Barbara	109.51 tons
Shasta	1,934.13 tons
Unknown	<u>218.80 tons</u>
Total	2,866.84 tons

c. Used Tires

Oxford Tire Recycling of Northern California collects tires from landfills, service stations, and tire dealers and transports the tires to its facility in Union City, California, where the tires are separated for delivery to an appropriate end use. Tires in resalable condition and casings that can be used for retreaded tires are taken to tire distributors. The tires can also be used to obtain tire-derived products such as playground covering, floor mats, dock bumpers, floor tiles, asphalt rubber, and rubber-modified asphalt. Tires are also taken to a shredding facility in Sacramento, California. Shredded tires can be used as playground cover material or as tire-derived fuel.

Tires that are not reused, or used for tire-derived products or shredded fuel, are taken to the Tire-to-Energy Plant in Westley, California. This facility, operated by the Oxford Energy Company, incinerates whole tires to produce steam to generate electricity. The plant recovers incineration by-products including fly ash and gypsum. Fly ash containing zinc is shipped to a smelting facility. Gypsum has nonagricultural land applications. Slag from the steel and fiberglass belts in the tires is recovered and used for road base (i.e., under asphalt).

d. White Goods

Individuals wishing to dispose of white goods can call a refuse hauler, charities (such as the Salvation Army and Goodwill Industries) or junk collectors; haul the items to the landfill; or use the materials as a trade-in for new items. At some landfills, controlled salvaging is authorized by the site operator if salvaging does not interfere with proper operation of the landfill. Salvaging results in reuse of variable materials and decreases wastes requiring landfill disposal.

White goods taken to scrap processing centers are utilized primarily for ferrous and non-ferrous metal content. Motors, insulation, upholstery, paint, plastics, and other non-metallic substances, commonly referred to as "fluff," are removed. Remaining metals are shredded, separated, and sold to re-smelters. Motors are sometimes processed separately for copper content. Most insulation removed from appliances is classified as a hazardous material, so special handling and disposal is required.

e. Abandoned Vehicles

Scrap automobiles are generally handled by firms specializing in auto dismantling, where usable parts are salvaged, scrap metal is recycled, and other components are disposed as appropriate for the waste type.

The City of Santa Clara has implemented an abandoned automobile removal program funded by the City's General Fund. The project is a joint effort between the City Planning Department and the Santa Clara Police Department. The annual cost is approximately \$120,000. Abandoned vehicles are tagged with a removal notice, then towed after the notice period expires by private, City-contracted, tow companies. The program disposes of 500-600 vehicles annually, amounting to 1,918 tons of materials. Since none of the landfills that the City uses accept auto

bodies, this amount cannot be counted in the total diversion quantity (nor as part of total MSW) under current SRRE regulations.

City residents also take their abandoned vehicles to salvage yards belonging to the Santa Clara County Auto Recyclers Association, and receive payment. Salvagers will tow inoperable vehicles, but owners are not paid if the vehicle must be towed to a lot.

From survey estimates, 1,918 tons of automobile bodies attributable to the City of Santa Clara were salvaged. Approximately half came from the City's abandoned vehicle program and half from resident drop-off.

f. Dead Animals

The primary management practice for small, dead animals in the City of Santa Clara is to contract for disposal with Koefran Services of Sacramento. Koefran provides a freezer at city animal shelters and the Humane Society of Santa Clara for storage of animal remains. Koefran collects the remains periodically and transports them to Sacramento, where the remains are recycled into bone meal and fertilizer by a rendering company. Large animals must be collected and processed by a rendering plant within 48 hours of death. Rendering firms serving local needs include, one in San Jose and firms located in Salinas and Sacramento.

2. Future Status of Programs

Of the special waste activities and programs identified above, the City of Santa Clara anticipates that all the above programs will be continued.

E. EVALUATION OF ALTERNATIVES

Management practices should take advantage of all viable markets and end uses for recyclable special wastes. In the City of Santa Clara, the recyclable special wastes include tires, abandoned vehicles, dead animals, and white goods. With the exception of the first alternative, the waste management methods evaluated in this section address the objective of increasing the recovery of recyclable special waste from the wastestream.

Alternative 1 - Disposal of Special Wastes

Special waste generated by the City of Santa Clara can be disposed of at the All Purpose, Newby Island, and Guadalupe landfills in accordance with the facility's Waste Discharge Requirements (WDR), issued by the Regional Water Quality Control Board. Based on these landfills' WDR's, all of the following special wastes described above, with the exception of abandoned vehicles, can be landfilled at the facility. The alternative of disposing of special waste in an environmentally safe manner in accordance with pertinent regulations is evaluated below to determine whether this alternative is appropriate for the City of Santa Clara, as well as to compare it to other alternatives.

a. Effectiveness

This alternative does not reduce quantities of special wastes currently disposed of.

b. Hazard

Workers responsible for the disposal of special waste are subjected to both health and safety risks from the handling of potentially hazardous materials and bulky items. To reduce the hazard potential, workers should be properly equipped and trained in handling hazardous wastes. In addition, workers should receive basic safety training.

c. Flexibility

With relatively minor changes in the management of special wastes (excepting sewage sludge), disposal of special wastes can be adjusted to conform with changing conditions.

d. Consequences to the Wastestream

This alternative would not affect the wastestream.

e. Implementation Period

No "start-up" period would be required.

f. Facility Requirements

This alternative would not require any new or expanded facilities.

g. Consistency with Local Conditions

Disposal of these identified special wastes is consistent with local plans and policies.

h. Institutional Barriers

There are no significant institutional barriers to this alternative.

i. Estimated Cost

No significant additional costs are associated with this alternative.

j. End Uses

Not applicable.

Alternative 2 - Sewage Sludge Composting

Composting is the controlled biological decomposition of solid organic materials. The end product of composting is a stable humus or soil-like material that can be used as a soil conditioner, mulch, or fertilizer, depending on its physical properties. Sewage sludge generated in the City of Santa Clara can be composted and sold to the general public for such uses. The benefit of composted sludge, as compared to non-composted sludge, is that most odors are eliminated during the composting process, making a more appropriate product for general public use.

a. Effectiveness

This alternative would be effective in diverting sewage sludge from disposal.

b. Hazard

Assuming that the composted sludge is not applied to land used for agricultural crops, this alternative does not have any known hazards.

c. Ability to Accommodate Change

The ability of this alternative to accommodate change is limited to the amount of composted sludge that can be stockpiled during unfavorable market conditions.

d. Consequences to the Wastestream

This alternative will not shift the wastestream toward non-recyclable or unmarketable materials.

e. Implementation Period

Implementation of this alternative cannot be accomplished in the short-term.

f. Facility Requirements

Additional facilities are needed.

g. Consistency with Local Plans and Policies

This alternative is not consistent with local plans and policies. The San Jose/Santa Clara Wastewater Treatment Plant has not determined an ultimate disposal alternative.

h. Institutional Barriers

There are institutional barriers to this alternative. The State has not issued guidelines for the acceptable use of sewage sludge compost.

i. Estimated Cost

This alternative normally requires minimal implementation and operating costs. Annual operating expenses are expected to range between \$50,000 and \$100,000.

j. End Uses

Composted sewage sludge can be sold to the general public as a soil condition, mulch, or fertilizer. A relatively stable market is anticipated to be available for this product.

Alternative 3 - Land Application of Sewage Sludge

Sewage sludge generated in the City of Santa Clara can be used beneficially as soil amendment or fertilizer for agricultural purposes. Benefits accruing from the use of sludge for these purposes include reduced need for inorganic fertilizers, improved soil fertility and tilth, decreased consumption of energy, and reduced hazardous air emissions.

a. Effectiveness

This alternative would be effective in diverting sewage sludge from the wastestream.

b. Hazard

Uptake of heavy metals (Cd, Pb, etc.) in food crops could pose a potential health hazard. The characteristics of the sludge will determine its suitability for application at a particular site.

c. Ability to Accommodate Change

This alternative can be limited by changing conditions, particularly social acceptance of the use of sewage sludge for application to land.

d. Consequences to the Wastestream

This alternative would not affect the wastestream since sludge is not currently disposed of at a landfill.

e. Implementation Period

This alternative can be implemented during the short-term planning period.

f. Facility Requirements

A facility would be required where the sludge could be stabilized in order to be transported.

g. Consistency with Local Plans and Policies

This alternative is not consistent with local plans and policies as there is no location available or permitted.

h. Institutional Barriers

This alternative would require the acceptance of local farmers and farm bureaus.

i. Estimated Cost

Costs are anticipated to be minimal, with the cost of transporting the sewage sludge to the site of application being the most significant. Depending on the exact quantities of sludge diverted, current sludge handling costs are estimated to increase from about 5 to 20 percent.

j. End Uses

When applied to land, sewage sludge functions as soil amendment or fertilizer. The southern portion of Santa Clara County is a potentially significant market due to the extensive agriculture in the area.

Alternative 4 - Divert Tires from Landfilling for Ultimate End Use

Used tires generated in the City of Santa Clara can be reused or recycled as a variety of end products including floor tiles, dock bumpers, and playground covering. An important component of this alternative is the availability of a facility to stockpile used tires. The City of Santa Clara's All Purpose landfill facility operator has developed a contractual arrangement with Oxford Tire Recycling of Northern California to collect used tires generated by the City. The other landfill operators have done likewise. The collected tires would ultimately be recycled as specific end products or would be used as tire-derived fuel for the generation of electricity.

a. Effectiveness

This alternative could be effective in reducing the quantity of used tires in the wastestream.

b. Hazard

Prior to being processed, waste tires are stockpiled. When exposed to the elements, stored tires collect rainwater and serve as breeding grounds for disease vectors; they can also be a fire hazard. To minimize the hazard potential, the storage times should be limited. Additionally, the stockpiled tires can be protected from the elements by a tarp.

c. Ability to Accommodate Change

Provided that waste tires can be sent to a regional facility for storage during unfavorable market conditions, this alternative can accommodate changing conditions. However if a regional waste tire facility (such as that operated by Oxford Tire Recycling) were not available, this alternative would be limited in its flexibility.

d. Consequences to the Wastestream

This alternative would have a positive effect on the wastestream by diverting a problem waste from landfilling. Tires represent approximately 2.7 percent of the disposal wastestream in the City of Santa Clara.

e. Implementation Period

Implementation would be dependent on the establishment of a regional facility permitted to accept only shredded tires. It is anticipated that this could occur within the short-term planning period provided that there is strong support on the regional level.

f. Facility Requirements

A procedure for the stockpiling of tires would need to be established. Used tires would be stockpiled on site for future processing and then transported to a processing facility permitted to accept tires.

g. Consistency with Local Plans and Policies

Diversion of tires for ultimate end use is consistent with plans and policies and ordinances of the City of Santa Clara.

h. Institutional Barriers

Existing waste hauling and disposal contracts may be affected if used tires are diverted to a waste tire facility for ultimate recycling. There could be resistance from these companies in diverting this waste from the universe of disposed wastes because of the potential for reduced revenues.

i. Estimated Cost

Cost is estimated at \$67/ton (approximately \$0.50 per tire). For the estimated 7,000+ tons of tires produced annually, the cost to recycle would be almost \$500,000 annually.

j. End Uses

Used tires in good condition can be resold, and casings usable for retreaded tires can be marketed to tire distributors. Used tires can also provide the raw material for tire-derived products such as playground covering, floor mats, dock bumpers, floor tiles, asphalt rubber and rubber-modified asphalt. Additionally, tires can be shredded at a shredding facility and ultimately used as playground cover material, or as tire-derived fuel.

Tires that are not reused or are used for tire-derived products or fuel can be taken to a Tire-to-Energy Plant. Here whole tires are incinerated to produce steam to generate electricity. Tire-to-Energy Plants can recover incineration byproducts that include fly ash and gypsum. The fly ash (which contains zinc) can be shipped to a smelting facility; gypsum can be used for nonagricultural land applications. Slag from the steel and fiberglass belts in the tires can be recovered and used for road base (i.e., under asphalt). There is currently a fairly stable market for used tires in northern California.

Alternative 5 - Prohibit Disposal of Used Tires at Landfills

Used tires could continue to be accepted at all the landfills, but would be banned from disposal. The landfill would require waste haulers to identify used tires in the incoming loads and to deposit them at a specified stockpile location at the landfill site. Stockpiled tires could then be recovered by a tire recycler, such as Oxford Tire Recycling of Northern California.

a. Effectiveness

This alternative would be effective in diverting tires from disposal, provided that transport, processing, and ultimate recycling can be arranged.

b. Hazard

Stockpiled used tires can collect rainwater and serve as breeding grounds for disease vectors, and can also be a fire hazard. These hazards are difficult to control; limiting the storage time and protecting the tires from exposure to the elements by covering with a tarp are recommended control mechanisms.

c. Ability to Accommodate Change

The ability of this alternative to accommodate change is limited to the quantity of tires that can be stockpiled on-site during unfavorable market conditions.

d. Consequences to the Wastestream

This alternative would divert tires from the wastestream; tires represent approximately 2.7 percent of the waste in the City of Santa Clara.

e. Implementation Period

A landfill ban on tires could be implemented in the short-term planning period.

f. Facility Requirements

No facilities are necessary for this alternative. However, space would need to be made available at all the landfills.

g. Consistency with Local Plans and Policies

This alternative is consistent with local conditions for stockpiling of tires.

h. Institutional Barriers

Waste hauling and landfill operating contracts may provide a barrier to this alternative because of the potential for reduced disposal revenues.

i. Estimated Cost

There are significant costs associated with this alternative to some landfill operators. Disposal of tires was taking place with current landfill staffing at costs lower than the estimated \$67 per ton tire recycling cost. Spread over all the landfilled tons, the cost increase could be as high as \$2-\$3 per ton tipping fees, or charged on each tire it would cost be approximately \$0.50 per tire.

j. End Uses

See the discussion of end uses for used tires provided with Alternative 4. There is currently a fairly stable market for used tires in northern California.

Alternative 6 - Prohibit Disposal of White Goods at Landfills

White goods could continue to be accepted at all landfills, but would be banned from disposal. The landfill would require waste haulers to identify white goods in the incoming loads and to deposit them at a specified stockpile location at the landfill site.

a. Effectiveness

This alternative would be effective in diverting white goods from disposal.

b. Hazard

Stockpiled white goods may pose health risks to workers as a result of exposure to PCBs. To reduce the potential for hazard, workers should be properly trained in handling PCBs and provided with appropriate safety gear and equipment.

c. Ability to Accommodate Change

The ability of this alternative to accommodate change is limited to the quantity of white goods that can be stockpiled on-site during unfavorable market conditions.

d. Consequences to the Wastestream

This alternative would divert white goods from the characterized wastestream. In 1990, white goods represented approximately 0.5 percent of the waste in the City of Santa Clara.

e. Implementation Period

A landfill ban on white goods could be implemented in the short-term planning period. The site RFI must be amended 120 days prior to implementation.

f. Facility Requirements

This alternative requires an area at the landfill for stockpiling white goods, but does not require any new facilities. Existing landfill staffing is considered sufficient to implement this alternative.

g. Consistency with Local Plans and Policies

This alternative is consistent with local plans and policies.

h. Institutional Barriers

Existing waste hauling and landfill operating contracts may provide a barrier to this alternative unless modifications can be readily implemented.

i. Estimated Cost

There are no significant costs associated with this alternative. White goods can be stockpiled by existing landfill personnel.

j. End Uses

White goods can be repaired and reused; they can also be used for scrap metal following the removal of electrical capacitors and cooling units. The metal components of the white goods are processed for reuse in mills and foundries to produce new steel.

Alternative 7 - White Goods Processing Operation

White goods can be diverted from the wastestream at the transfer station and/or the landfills by facility personnel. As incoming loads are discharged, the spotter and the equipment operator will separate identified white goods from the discharged load. The white goods will then be moved to an area clear of operations in the transfer station or to an area removed from the active face at the landfill. At the end of each day, the collected white goods will be moved to a designated white goods stockpile area. At the stockpiled area, electrical capacitors, cooling units, insulation, and wiring will be removed. The electrical capacitors and cooling units will be recycled and the insulation and wiring landfilled. The scrap metal will be sold to a scrap metal dealer.

a. Effectiveness

This alternative would be effective in diverting white goods from disposal.

b. Hazard

Potential hazards include risk of injury to landfill personnel from removing the white goods or from working around heavy equipment, and exposure to PCBs. To reduce the potential for hazard, workers should be properly equipped and trained in handling PCBs.

c. Ability to Accommodate Change

This alternative is limited by the quantity of white goods that can be stockpiled on-site during unfavorable market conditions.

d. Consequences to the Wastestream

This alternative would divert white goods from the wastestream; white goods account for approximately 0.5 percent of the City's wastestream.

e. Implementation Period

Immediate implementation appears feasible using equipment and personnel that are currently available at all landfills.

f. Facility Requirements

This alternative requires an area at the landfill for stockpiling white goods, but does not require any new facilities.

g. Consistency with Local Plans and Policies

This alternative is consistent with local plans and policies.

h. Institutional Barriers

Changes to the union contract and landfill personnel job descriptions may be necessary. Some unions (and personnel) may be reluctant to handle the hazardous components of white goods (capacitors and cooling units).

i. Estimated Cost

There are no significant costs associated with this alternative; however, additional labor would be required to dismantle the white goods. An additional staff person on a part-time basis is expected to be sufficient. Costs are not expected to exceed \$15,000 per year.

j. End Uses

The electrical capacitors and cooling units that have been removed from the white goods can be recycled. The remaining scrap metal can be processed for reuse in mills and foundries to produce new steel. The market for scrap metal is relatively stable.

F. SELECTION OF PROGRAM

In the previous section, seven alternatives were presented for consideration; each was evaluated according to a range of criteria mandated by the regulations governing AB 939. Each alternative has inherent qualities that makes it either more or less attractive to the City of Santa Clara. In addition, each alternative has aspects that may be more or less appropriate to the City of Santa Clara's goals, objectives, policy environment, wastestream, and solid waste management system.

In this section, the City of Santa Clara presents the results of the evaluation of the alternatives presented in the previous section. To accomplish this, the City of Santa Clara has assessed whether or not each alternative is appropriate to the City's needs and assigned each alternative a ranking in order to select various alternatives. In selecting among alternatives and programs, the City of Santa Clara considered the following critical factors: (1) the degree to which each alternative and program is appropriate to the conditions of the jurisdiction (i.e., goals, objectives, policy environment, wastestream, and solid waste management system), and (2) the degree to which the alternatives and programs complement each other and form a coherent, comprehensive, and cost-effective package. Alternatives were assigned ratings of high, medium, and low according to the assessment of their evaluation criteria. The results of these ratings are presented in Table VI-B.

Based on the results of this evaluation and assessment, the alternatives selected to meet the goals and objectives of this component in the short-term and medium-term planning periods are presented below.

1. Short-Term Planning Period

In order to meet the goals and objectives outlined in this component, the City of Santa Clara will divert approximately 1.5 percent of the total wastestream in the short-term planning period. The City of Santa Clara has selected the following alternatives:

- a. Continue Prohibition of Disposal of Special Identified Wastes (abandoned vehicles, asbestos, dead animals)
- b. Divert Tires from Landfilling
- c. Process White Goods

This selection is based on impact and effectiveness as well as ease of implementation in the short-term.

Table VI-B

Evaluation of Special Wastes Collection Alternatives

Evaluation Criteria	Alt. 1 Disposal of Special Wastes	Alt. 2 Sewage Sludge Composting	Alt. 3 Land Application of Sludge	Alt. 4 Divert Tires from Landfilling	Alt. 5 Prohibit Disposal of Tires at Landfill	Alt. 6 Prohibit Disposal of White Goods at Landfill	Alt. 7 White Goods Processing Operation
Effectiveness	1	4	4	5	5	5	5
Hazard	3	3	3	5	5	4	5
Ability to Accomodate Change	5	1	1	4	3	3	4
Consequences to the Wastestream	3	3	3	5	5	5	5
Implementation Period	5	1	1	5	4	4	5
Facility Requirements	5	2	2	4	3	3	4
Consistency with Local Plans and Policies	5	2	2	4	2	2	4
Institutional Barriers	5	1	1	3	3	3	3
Estimated Cost	5	2	2	2	4	4	2
End Uses	3	3	3	3	3	3	3
Public/Private	5	5	5	5	4	4	4
Total	45	27	27	45	41	40	44

Scoring: 5 = Highest Criteria
1 = Lowest Criteria

- Continue and review methods of disposing of special waste. This program will not result in any diversion of the total generated wastestream.
- Continue to expand a program to divert tires from landfilling for ultimate end use. This program will divert in 30 percent (3,773.7 tons) of the total generated wastestream for waste tires. This selection is based on impact and effectiveness as well as ease of implementation in the short-term.
- Continue to expand a white goods processing operation at the All Purpose and Newby Island landfills. This program will divert 50 percent (661.8 tons) of the total generated wastestream for white goods. This selection is based on impact and effectiveness as well as ease of implementation in the short-term.

2. Short-Term and Medium-Term Planning Periods

In order to meet the goals and objectives outlined in this component, the City of Santa Clara will divert approximately 1.5 percent (4,234.5 tons) of the total wastestream in the short-term planning period. All programs and alternatives selected in the short-term planning period will be continued in the medium-term.

The City of Santa Clara has selected the following alternatives to meet the objectives:

- Continue Prohibition of Disposal of Special Identified Wastes (asbestos, abandoned vehicles, and dead animals)
- Divert Tires from Landfilling
- Process White Goods

No new facilities are necessary to implement the selected alternatives in the short-term and medium-term planning periods.

3. Program Implementation

This section identifies and describes the specific government agencies responsible for implementing the selected alternatives and programs; the specific tasks necessary to achieve full implementation of the selected alternatives and programs; and an implementation schedule. This information is presented in Table VI-C. Additionally, the costs, revenues, and revenue sources necessary for implementation of the selected programs are presented in Table VI-D.

Table VI-C

Special Waste Program Implementation

Task	Responsible Agency	Implementation Date
1. Continue Prohibition of Disposal of Special Waste:		Ongoing
- Asbestos	Private	
- Dead Animals	County/City	
- Abandoned Vehicles	City/Private	
- Sewage Sludge	City	
- Ash	Private	
2. Divert Tires from Landfill	Landfill Operator/City	FY 1991-1992
	Private	FY 1991-1992
3. Process White Goods	City/Landfill Operator	FY 1991-1992
	Private	FY 1991-1992

Table VI-D

Special Waste Implementation Costs for New/Added Programs

Task	Costs	Revenues	Revenue Sources
1. Continue Existing Special Waste Disposal Programs	note (1)	note (1)	General Funds; Tipping Fees; User Fees
2. Divert Tires from Landfill	\$500,000	\$500,000	Tipping Fees (2)
3. Process White Goods	\$15,000	\$15,000	Tipping Fees (2)

Notes:

(1) Costs of new or added programs only unless noted.

(2) Costs currently funded from landfill tipping fee revenues.

4. Multi-Jurisdictional Special Waste Efforts

Multi-jurisdictional special waste efforts may be needed to implement some of the programs. For example, dead animals are currently handled at the County level. Other potential multi-jurisdictional efforts include (1) multi-jurisdictional waste tire facilities, (2) establishment of a county landfill permitted to accept only shredded tires, and (3) coordination of marketing of composted sludge.

G. MONITORING AND EVALUATION

To ensure that the selected special waste alternatives and programs are meeting the goals and objectives of this component, the City will implement a monitoring and evaluation program. Because the objectives of this component extend throughout both the short-term and medium-term planning periods, the City's monitoring and evaluation program will continue, as needed, during both planning periods.

This section presents the methods for quantifying and monitoring the achievement of the following objectives for the special waste component.

- Objective 1: Reduce the hazard potential of asbestos, abandoned vehicles, and dead animals.
- Objective 2: Continue existing programs that divert recyclable special waste from landfilling including tires and white goods.
- Objective 3: Continue to provide for environmentally safe management or disposal of special waste that cannot be recycled.
- Objective 4: Increase the recovery of recyclable special waste from the solid wastestream.

1. Monitoring Method:

Periodic inspections of handling methods for special waste will be conducted at the All Purpose Landfill. These will focus on (1) determining whether waste handling methods required by the regulatory agencies are being implemented, (2) checking to ensure that facility staff is properly outfitted and equipped to handle specific "problem" wastes, and (3) verifying that staff is properly trained in safety and hazardous waste handling methods. In addition, further waste characterization studies will be conducted at the end of the short-term planning period to measure changes in both waste types and waste quantities. These studies will be combined with more informal "spot check" assessments of waste composition to monitor the increased diversion of special waste from landfilling. Specific emphasis will be given to quantifying the reduction in landfilling of special waste that poses health and safety hazards.

2. Written Criteria

The City will prepare annual reports summarizing the findings of the monitoring activities described above. The report will provide written criteria evaluating the effectiveness of the special waste alternatives by reporting on whether (1) the special waste objectives are being achieved; (2) the selected programs and activities were implemented on schedule; (3) waste handling practices have changed.

3. Responsibility For Monitoring

The monitoring and evaluation activities described in this section will be implemented by the Street Department.

4. Funding Requirements

Funding for the monitoring and evaluation program described in this section will be provided by the City through its General Fund. Funding for this program includes the costs of (1) administrative activities, (2) recordkeeping, (3) program monitoring and surveying, (4) tracking of survey results, and (5) annual report-writing.

5. Contingency Measures

If the programs described above fail to meet the goals and objectives of this component, the following tasks can be implemented:

- Introduce additional waste acceptance procedures at the landfill in order to divert special wastes from disposal.
- Increase staffing at the landfill for salvaging materials at the active dumping area of the landfill.
- Locate new/additional markets for recovered recyclable special wastes.
- Amend special waste disposal practices.
- Analyze existing programs and alternatives for obstacles to successful implementation.
- Modify selected alternatives, including degree, scope, or extent of special waste activity and implementation schedule.
- Seek additional funding
- Select additional alternatives
- Consider regulatory programs or mandatory programs

CHAPTER VII PUBLIC EDUCATION AND INFORMATION COMPONENT

Introduction

Education and public information is one of the most important components of AB 939. The public needs to be made aware of the importance of managing solid waste. An education and information program must be based on the requirements of the other components. Integrating the components is critical because the overall approach to solid waste management must be balanced in order to meet the needs of the jurisdiction and the requirements of the state.

A. GOALS AND OBJECTIVES

This component documents current education and public information activities for the City of Santa Clara and describes how participation in reduction, recycling, and composting activities will be stimulated through implementing new education and public information programs and expanding existing ones.

Establishing clear goals and objectives for educational efforts provides an understanding of the program to governmental agencies, residents, and the business community. In addition, monitoring, evaluation, and improvement of public education become easier when the goals and objectives are specified.

Goals identified by the City of Santa Clara include:

- support existing and planned source reduction, recycling, and composting programs and services through education and public information activities;
- increase participation in existing and planned source reduction, recycling, and composting education and public information efforts;
- increase public awareness of environmental and solid waste issues;
- create broad visibility for recycling;
- familiarize consumers with recycling;
- motivate increased participation in available source reduction and recycling programs by all sectors;

The following sections describe short- and medium-term objectives for the City of Santa Clara's Education and Public Information Component.

1. Short-Term Objectives

- a. Develop and expand existing public education and information programs to address source reduction, composting, recycling, and household hazardous waste, tailored to the residential, commercial, and industrial sectors;
- b. provide information to all City of Santa Clara residents regarding the City's waste reduction and recycling programs by 1995;
- c. provide residents with detailed information for participation in local collection programs;
- d. educate the public about the uses of recycled and composted materials, emphasize "closing the loop" through a "buy recycled" campaign;
- e. cultivate support by publicizing and encouraging involvement of the business community;
- f. participate in countywide public education efforts.

2. Medium-Term Objectives

Medium-term objectives build upon short-term objectives and will focus upon the following:

- a. expand existing programs;
- b. revise and improve current efforts based on feedback obtained from the evaluation of short-term activities;
- c. develop new programs to target specific sub-populations or wastestreams.

B. EXISTING CONDITIONS

1. Residential

In residential areas, the City's monthly utility bill insert newsletter (Mission City Scenes), quarterly Chamber of Commerce newspaper (Forecast) and special utility bill inserts, which are sent to all residences in the City, are used to publicize programs. Preparation of material and text is coordinated between the City of Santa Clara and the City's curbside recycling contractor, Santa Clara Recycling. Examples of educational and informational brochures currently used can be found in Appendix VII-A.

The City of Santa Clara has participated in creating and staffing an educational display at the 1990 County Fair, promoting recycling in general, as well as curbside programs for individual cities.

2. Multi-Family

The City of Santa Clara initiated a pilot multi-family recycling program in February 1991 through a grant from the California Department of Conservation, Division of Recycling. As part of that program, a brochure was developed and delivered to the participants to outline the program. (see Appendix VII-B)

For multi-family units, the educational approach has focused on encouraging recycling of mixed glass, aluminum cans, plastic soda bottles (PET), corrugated cardboard, and newspaper.

3. Commercial and Industrial

The City of Santa Clara initiated a commercial recycling assistance program in 1989. As part of that program, a staff person is available to direct businesses to local recyclers and provide information on implementing recycling programs.

For businesses, the educational approach has centered on office paper, cardboard, wood, and mixed glass recycling.

A number of businesses and industries have participated in the Santa Clara County Manufacturing Group, which has recently published the "Guide to Commercial Recycling." The City of Santa Clara has a staff person who attends this group's meetings and assisted in the preparation of this publication. This Group is also involved with setting up a recycling workshop for its members.

The City of Santa Clara was one of several communities to cosponsor the "Business Environmental Networks Conference" on April 22, 1991. This one-day conference for the business community addressed a number of issues pertaining to solid waste management.

4. Institutional and Municipal

An educational program for city employees was begun in 1990 to educate the employees about the importance of recycling and to respond to questions from residents.

5. Other Programs

The Loma Prieta Chapter of the Sierra Club and the Association of Bay Area Government (ABAG) are active in providing brochures, informational fact sheets, and have produced video tapes promoting recycling. These promotional materials are used by the City of Santa Clara in making presentations and preparing responses.

C. PROGRAM ALTERNATIVES

To heighten the effectiveness of the various programs, and ensure an efficient use of resources whenever possible, public education and information resources should be targeted to specific audiences. Segmenting the community into various categories of waste generators provides a simple and useful means of directing specific messages.

The Solid Waste Generation Study for the City of Santa Clara indicated that the following are major categories of waste generation in the City: commercial, industrial, and businesses with residential and multi-family residential accounting for the majority of the rest.

1. General Approaches to Education and Public Information

- Designate a staff member to be in charge of developing public education and publicity materials in conjunction with Santa Clara Recycling (hauler). Staffing needs will be sufficient to allow for both work in the office and in the field.
- Develop a program that addresses solid waste management in general and AB 939 specifically. The program would be geared to all waste generators.
- Assess the size of the community's non-English speaking or reading populations, in order to tailor education and publicity materials accordingly.

Numerous avenues of communication are available that would allow the transmission of education and public information to the targeted waste generators. Examples are:

- mass mailings (community newsletters), either alone or with utility bills;
- placement of door-knob hangers;

- recognizable theme, logo, and message. The logo should appear on all printed and outdoor advertisements, as well as waste collection vehicles and equipment. Outdoor advertising can be placed on billboards, buses, bus shelters, benches, banners, posters, and litter receptacles;
- use of a celebrity spokesperson or mascot as part of these efforts;
- press coverage of as many promotions, program introductions and effectiveness updates, and other notable events as possible;
- press coverage through news conferences, feature stories, press kits and press releases;
- newspaper articles and inserts (Forecast, San Jose Mercury News, Valley Weekly);
- local radio and TV to produce awareness shows or public service messages and outdoor advertising;
- seminars, workshops, and related programs;
- participation in special events [e.g., Earth Day, Recycling Week, County Fair, Tapestry in Talent Festival, Garlic Festival, Mushroom Festival, Santa Clara Art and Wine festivals, and local events such as employees' picnics, holiday parades and celebrations];
- slide shows, videos, and speakers' bureaus available to community groups;
- recycling curriculum and other information distributed to public and private schools;
- cooperation with community service organizations [e.g., Elks, Lions, Boy Scouts].

2. Education and Public Information Approaches Based on Waste Sector

a. Residential Sector

Approaches to consider when developing public education programs for the residential sector include:

Meetings and Forums

- sponsor city meetings and public hearings to present and discuss reduction, reuse, recycling, and composting ideas;

- utilize citizen advisory boards or task forces to monitor events and report to the public;

Volunteer Networks

- Develop a network of motivated and committed volunteers to help "spread the word." This method has been proven particularly successful in disseminating composting information through gardening clubs and community gardens in what are often called "Master Composter" programs;

Exhibitions

- exhibit source reduction, recycling, and composting programs at county fairs, shopping centers, parks, community gardens, and other public sites;
- conduct tours, open houses, and publicity events at recycling centers and waste processing facilities to give the public a better understanding of the issues.

b. Commercial and Industrial Sector

The tactics available for reaching the commercial and industrial sectors are generally simpler and more direct. The City can develop materials specific to individual industries or businesses, and disseminate these to the businesses in question via a number of approaches, which may include:

- conduct mailings to businesses;
- work with the Chamber of Commerce, Santa Clara Manufacturing Group, and other business and professional associations;
- develop a speakers bureau of educators, industry and technical representatives, and governmental officials to talk to professional organizations, the Chamber of Commerce, major employers, conservation groups, social clubs, and other groups;
- develop a commercial waste audit kit. Once the audit has been conducted, the City can work with businesses to improve their disposal activities and in doing so will provide direct education and information to these waste generators;
- work with various unions to encourage members to get involved (i.e., union sanctioned functions or workshops);
- develop specific programs tailored for the need of individual businesses (i.e., bakeries, dry cleaners);

- establish programs for specific business parks and centers;
- prepare employee kits that explain the various programs. These can be passed out by employers;
- require refuse haulers to do waste audits and contact customers periodically to offer recycling services.

c. Institutional Sector

The City of Santa Clara will need to work in cooperation with Santa Clara Unified School District and private schools to develop innovative approaches to educating the youth of the community.

The following approaches could be utilized specifically for schools:

- sponsor special events in schools;
- initiate student-run recycling programs at each school;
- where feasible, establish student-run pilot composting program;
- expand environmental and waste management awareness in schools by integrating relevant topics into school curricula;
- target non-English speaking youth through bilingual education programs.

The City of Santa Clara would need to work in cooperation with hospitals, colleges, jails, municipal, county, and state agencies to develop appropriate programs, such as:

- conduct waste audits, and upon completion, assist in developing recycling, source reduction, and composting programs;
- initiate training programs for municipal and county employees to assist in answering questions from residents about existing and anticipated programs as outlined in the SRRE;
- cooperate with the county and state to develop programs to manage solid waste for agencies located within the community.

3. Specific Approaches Based on Programs

A well-integrated education and public information program is necessary. The initial educational campaign must be followed up by additional information about specific components. The following areas have been identified as needing specific information and educational programs: recycling, composting, household hazardous waste, special waste, and source reduction.

a. Source Reduction

The emphasis will be to inform the public that alternatives to many products and uses are available and that these alternatives will reduce the amount of material requiring disposal at the landfill.

To a great extent, source reduction can be accomplished only through legislative means. Requiring manufacturers to reduce the amount of packaging or change the type of packaging must be left up to state and federal governments. One problem that will be difficult to overcome is concern about product safety and integrity. Over the years, there has been product tampering (most noteworthy in the pharmaceutical industry). This has caused manufacturers to adopt tamper-proof packaging which, in some cases, has actually increased the amount of packaging.

A number of educational alternatives are available that will address residential and commercial source reduction. The use of brochures, the media, and public meetings are several avenues that can be used to inform the public. Program possibilities are:

Residential

- educate residents about the benefits of buying and using cloth shopping bags instead of plastic or paper;
- explain to residents how they can launch a letter-writing campaign requesting manufacturers and businesses (e.g., fast food outlets) to reduce the amount of packaging materials and/or switch to materials that are more sensitive to the environment;
- distribute to residents the necessary information so they can write to their elected representatives at both the state and federal levels, requesting that action be taken to reduce the amount and type of packaging materials being used;
- encourage the use of on-site composting and grass clipping programs through demonstration programs at neighborhood parks, use of Master Gardeners, and/or initiating a Master Composter program, and develop accompanying information to explain the benefits of programs;

- encourage the use of cloth diapers, in cooperation with a local medical association and diaper services;
- provide a directory of reuse and repair businesses;
- provide information on how to remove names from junk mail lists.

Commercial, Institutional, and Industrial

- promote source reduction, for example, through trade unions, business and industrial organizations, PTA meetings, and on-site presentations;
- encourage supermarkets and other large retailers to reduce the use of plastic shopping bags (and other plastic bags) by switching to paper bags and encouraging the use of cloth bags;
- publicize businesses that reuse and repair materials (e.g., repair stores and thrift stores);
- develop materials and provide technical assistance to allow "do-it-yourself" waste audits;
- develop materials and provide technical assistance to encourage the use of on-site composting and grass clipping programs.

b. Recycling

The emphasis will be to enhance the current recycling education and information programs. The following are recommended approaches:

Residential

- enhance the residential curbside education program. Part of this approach would include a study to determine whether bilingual materials will be needed;
- expand information that explains the various enforcement procedures that the City of Santa Clara has initiated. Examples include ordinances that prohibit the removal of recyclable materials from curbside by other than a licensed hauler, or destruction of recycling equipment;
- work with recycling service providers and community groups to publicize the locations and promote the use of buy-back/drop-off collection centers;

- provide feedback to the public on the success of the recycling programs (i.e., amount of materials recycled/resources saved, and the economics of the programs). Provide feedback through advertisements in local newspapers, utility bill inserts, and publishing of annual reports.

Commercial, Institutional, and Industrial

- in cooperation with the school district, develop educational programs for grades K-12. Specific programs for the different age groups and/or grade levels would be appropriate. Part of the program would be an actual on-site recycling program. These programs will also be available for use at private schools;
- expand the commercial and industrial recycling education programs;
- develop pre-planned educational programs for specific businesses (e.g., dry cleaners, bakeries, service stations, etc.);
- use mailings to businesses giving information about the commercial recycling program;
- work with the Chamber of Commerce, the Santa Clara County Manufacturing Group, unions, and other business groups to inform the business community;
- expand and update a list of brokers who deal with recyclables and mail to requesting businesses and industries.

c. Composting

A limited portion of the population understands what compost is or the benefits of using it. The information and education program will consider these approaches:

Residential

- develop educational materials that address the proposed residential yard waste collection program for leaves, grass clippings, and other vegetative material, with corresponding information on handling;
- inform the public how they can obtain compost and mulch from compost programs;
- work with local garden clubs and Master Gardeners to help promote and educate the public;

- work with the University of California cooperative extension to develop educational materials;
- provide feedback to the public on the amount of yard waste collected and composted and how this material is used (through publishing of annual reports and reports in local newspapers);
- educate the public on the benefits of using compost and mulch for home purposes;

Commercial, Institutional, and Industrial

- develop information and education materials to support commercial, institutional, and industrial yard and wood waste collection programs.

d. Special Wastes

Special wastes, like infectious wastes, sludge, and ash, are quite specific and would not necessarily require that an educational program be developed. Other special wastes will require that educational materials be developed. Examples of programs to consider are:

Residential

- expand materials that inform the public how to properly dispose of such things as tires, white goods, auto bodies, and certain wood wastes. One approach is to publish a brochure on special wastes and mail it to all residents;
- expand information to explain special clean-up day events. Information must be sent out prior to the actual day of pick-up. The information will include what can be disposed of, the date, and time of day;
- expand information about the proper procedures to remove and dispose of asbestos. List local firms that are licensed to remove asbestos;

Commercial, Institutional, and Industrial

- develop materials that inform how to properly dispose of such things as tires, white goods, auto bodies, and certain wood wastes. One approach is to publish a brochure on special wastes and mail it to all industries, institutions, and businesses;
- develop information for commercial and self-haul generators that will explain about disposing of construction and demolition debris.

e. Household Hazardous Waste

The Household Hazardous Waste Element addresses education and information. Most of the same avenues available for dissemination of information in the other components can be utilized to educate the public about the handling and disposal of household hazardous waste. Refer to the Element for detailed discussion on education and information.

D. PROGRAM SELECTION

1. Short-Term

a. General Approaches

- develop the office of education and public information;
- develop and expand a program that addresses solid waste management in general. Approach should be directed to residential, commercial, and industrial generators;
- provide feedback to the public on the success of all implemented programs. Methods include publishing information in the City's annual report and newspaper articles;
- assess the need to develop educational materials for the non-English speaking or reading population;
- in cooperation with local public and private schools, assess the need for more educational materials for school age children. Topics to be covered are recycling, composting, source reduction, and household hazardous waste;
- develop information for commercial and self-haul generators to explain various options for the disposal of construction and demolition debris;
- develop information to accompany annual residential clean-up days events.

b. Source Reduction

- develop a backyard composting program. Include availability of composting kits, "how-to" literature, materials describing the uses for compost, and establishment of an instructional training program;
- develop materials that explain the grass clipping program;
- publish a directory of reuse and repair businesses.

c. Recycling

- enhance education materials for residential curbside recycling program;
- enhance materials for commercial and industrial recycling programs. Include "Recycling Kit," cooperative efforts with Chamber of Commerce, and establishment of a committee made up of business leaders;
- publish a directory that lists brokers and end users of recyclable materials;
- develop information that explains various enforcement measures that have been taken to protect recycling equipment and the illegal removal of recyclable materials from curbside collection programs;
- develop education materials for the proposed residential curbside collection of yard waste. Include information about how residents can obtain compost from the compost programs;
- develop materials to support a commercial wood waste drop-off program.

d. Special Waste

- develop education materials that describe how to properly dispose of special wastes.

e. Household Hazardous Waste

- develop materials to support the Household Hazardous Waste program.

2. Medium-Term

To a great extent, the various programs outlined under short-term are ongoing in nature. Once developed and initiated, they will need to be updated on an annual basis. Specific programs for the medium-term are:

a. General Approaches

- develop information about the various materials recovery facilities, their functions, and services provided;
- develop materials to support the various self-haul programs.

b. Household Hazardous Waste

- develop an information program for small quantity generators of household hazardous waste.

E. COST

The following costs are planning level estimates, developed for comparison purposes only. The estimates are based on a number of broad assumptions. Actual costs will vary. The cost to develop, implement, maintain, monitor, and evaluate the various tasks outlined in this component for staffing and program materials are expected to be approximately \$5,000 annually, with additional funding required for residential sector programs than for commercial sector programs. Approximately 80 to 120 hours per year of staff time is estimated to be needed to implement the education and public information program.

F. PROGRAM IMPLEMENTATION

Each component requires the implementation of certain education tasks to support the objectives of the component. While these stand-alone programs need to be developed, an integrated approach is also needed. It will be necessary to ensure that the public receives proper information in a phased approach. In some instances, the information and education provided will be appropriate for more than one issue. The way information is disseminated might be similar for several components (brochures, newspaper), but what is actually said, and how, is important. Due to the nature and flexibility of the selected education and information alternatives, it will be relatively easy to modify or refocus attention to any diversion short-fall.

Table VII-A shows the selected tasks for public information and education, responsible agencies, costs associated with the tasks, and implementation dates.

G. MONITORING OF PROGRAMS

The person in charge of public information will be responsible for monitoring the success of the programs.

The monitoring necessary to evaluate the various programs can be accomplished by means of one of more of the following approaches:

- number of schools and students exposed to various programs;
- number of businesses taking part in programs;
- number and size of community events and activities;
- number and frequency of media advertising purchased;
- surveys conducted to determine awareness and participation levels for the various components;

- complaints and requests for information received by the office of education and information and/or the contractors providing the various services;
- qualitative feedback from waste generators about the information program;
- the quantity of waste diverted by programs publicized through education and public information activities;
- costs per generator, per ton, or per "impression" for education and public information programs;
- the progress of the overall program toward diversion goals.

H. EVALUATION OF PROGRAM EFFECTIVENESS

The responsible person will evaluate the success of the programs. Reporting, outlining the success of individual tasks, comparisons with neighboring communities, and plans for next year, will be the responsibility of this office.

Evaluation can occur at various stages of the public education and public information process depending on the objective to be measured. The criteria used to evaluate the effectiveness of the education and public information efforts will be determined in advance and will be appropriate to the monitoring methods that have been chosen.

Formative evaluation attempts to identify the strengths and weaknesses of the messages, materials, and educational or informational strategies before one proceeds to full production, distribution or implementation. This is particularly important in the parts of a program that will require significant resources. Paid advertising, for example, can use up a great deal of a budget, and will be evaluated carefully before funds are committed.

Process evaluation assesses the organizational and administrative aspects of a program. Outcome and impact evaluation identify the immediate and longer term effects of efforts on the intended audience.

I. MONITORING SHORTFALLS

If the evaluation shows that specific diversion rates are not being achieved for certain programs and/or components, then expanding the education and information programs might be necessary. Methods that will be used include:

- increase the frequency, type, or extent of program monitoring and review to discover the reasons why diversion rates are not achieved;
- revise education and public information efforts to make them more effective based on results of evaluation;

- expand the education and public information programs by adding new components or increasing frequency;
- publicize new or additional incentives for participation in reduction, recycling, or composting programs.

It might be determined that the education and information aspects of the program are not what is preventing the individual programs from reaching their goals. If that is the case, the other programs will be modified accordingly to increase diversion.

Table VII-A

Public Education and Information Plan

Task	Responsible Agency	Implementation Date
Short-Term		
1. Organize and Develop Public Information Program Plan and Organizational Structure	City of Santa Clara	FY 1991-1992
2. Develop Informational Materials and Disseminate		
a. Source Reduction	City of Santa Clara	FY 1992-1993
b. Recycling	City of Santa Clara/ Santa Clara Recycling	FY 1991-1992
c. Special Wastes	City of Santa Clara	FY 1992-1993
d. Household Hazardous Waste	City of Santa Clara	FY 1991-1992
e. Commercial Business Recycling	City of Santa Clara	FY 1992-1993
f. Self-Haul Recyclers	City of Santa Clara	FY 1992-1993
3. Assess Need for Educational Materials for Schools	City of Santa Clara	FY 1993-1994
4. Assess Need for Bi-Lingual Materials	City of Santa Clara	FY 1991-1992
Medium-Term		
1. Continue Development and Update Informational Materials	City of Santa Clara	FY 1995-1996
2. Develop Small Quantity HHW Generator Informational Materials	City of Santa Clara	FY 1995-1996

Note: Tasks to start first quarter and be completed by end of fiscal year noted.

CHAPTER VIII SOLID WASTE FACILITY CAPACITY COMPONENT

A. GENERAL

Landfilling is the process of disposing of municipal solid waste onto land. Waste is compacted in layers and covered with soil or a suitable alternative. As the most common method of solid waste disposal today, landfilling will continue as the primary method of disposal of non-recyclable/non-reusable wastes in Santa Clara County.

Because the amount of landfill capacity is declining throughout California and the amount of municipal solid waste is increasing, many landfills in the State have reached or are approaching capacity. The Source Reduction and Recycling Element includes a solid waste facility capacity component to ensure that there is adequate landfill capacity for disposing of the solid waste that cannot be diverted by recycling or composting.

The specific purpose of the Solid Waste Facility Capacity Component is to calculate the amount of disposal capacity required to meet the needs of the City of Santa Clara for the next 15 years (calculated from the date of adoption of the SRRE). The component contains a description of the permitted solid waste disposal facilities currently used by the City of Santa Clara. It includes projections of the City's waste capacity needs for the next 15 years, and describes how the City will satisfy future capacity needs. The solid waste reduction goals and implementation schedules described in Source Reduction, Recycling, Composting, and Special Waste chapters of the Source Reduction and Recycling Element were incorporated into the projections of the City's future disposal facility capacity needs.

The Component also identifies disposal facilities that will be closed in the next 10 years, and describes plans to establish new or expanded disposal facilities during the next 10 years.

B. EXISTING PERMITTED SOLID WASTE DISPOSAL FACILITIES

1. Overview of Existing Disposal Facilities

There are nine permitted landfills in operation in the county: Guadalupe, Kirby Canyon, Mountain View, Newby Island, Pacheco Pass, Palo Alto, Santa Clara (All Purpose), Sunnyvale, and Zanker Road. All are classified as Class III facilities. Four sites (Mountain View, Palo Alto, Santa Clara, and Sunnyvale) are publicly owned. The remaining five are privately owned: Guadalupe by the Guadalupe Rubbish Disposal Company; Kirby Canyon by Waste Management, Incorporated; Newby Island by International Disposal Corporation, a wholly owned subsidiary of Browning Ferris Industries; Pacheco Pass by South Valley Refuse Disposal; and Zanker Road by Zanker Road Resource Recovery, Incorporated. Except for the Palo Alto site, all landfills are privately operated.

According to the Santa Clara County Solid Waste Management Plan (1989 Revision), the County had between 24 and 32 years of remaining refuse capacity. Using the current rate

of fill of approximately 1.8 million tons per year, and an annual growth rate of 1.1%, the Plan projected 24 years of remaining capacity. With a 25% reduction in wastes landfilled by 1995 (the Plan's goal), the County had projected 32 years of remaining capacity.

Owens-Corning Fiberglas Corporation owns and operates a non-permitted disposal site in northern San Jose for the disposal of wastes generated at their Santa Clara operations. The facility is not open for public use and is currently undergoing permitting procedures through the City of San Jose, LEA for the site.

Because the City of Santa Clara permits a number of refuse haulers to collect refuse within the industrially zoned areas of the City, these haulers use various landfills (Newby Island, Zanker Road, Guadalupe via San Jose Recycling II Transfer Station, and potentially, Kirby Canyon). It is also possible some public haulers may use the Sunnyvale landfill.

2. Guadalupe Rubbish Disposal Site

The Guadalupe Landfill is owned and operated by Guadalupe Rubbish Disposal Company, Inc. The site was opened in 1931 as an open burning dump, before beginning operations as a sanitary landfill in 1956. The facility presently accepts franchised waste from the cities of Campbell, Monte Sereno, and Saratoga, the Town of Los Gatos, the surrounding unincorporated areas, and waste from individual contractors and the general public.

The 115-acre landfill was recently annexed into the City of San Jose, and is located off Guadalupe Mines Road, in a canyon immediately north of the Guadalupe Mines. Surrounding land uses include laboratory research (IBM) to the north, the Almaden Quicksilver County Park to the southeast, and open space to the west and south. The site is zoned for agricultural, residential, and laboratory-research uses. Access is provided by a 4,000 foot paved road originating at Guadalupe Mines Road north of the site.

The Class III landfill accepts only residential, commercial, industrial, and demolition wastes as defined by State regulations. Except for non-friable asbestos, no hazardous or designated wastes may be accepted.

According to reports filed with the RWQCB, the facility landfilled 203,946 tons (approximately 396,562 cubic yards) of waste in the 1990 calendar year. The input tonnage is converted to in-place cubic yards by using a compaction factor of 1,200 pounds per cubic yard and a refuse to cover ratio of 6 to 1. As of January 1991, public disposal fees were \$6.00 per cubic yard, with a minimum charge of \$8.00. Tipping fees were \$27.82 per ton.

The landfill supports aggressive recycling activities, including salvaging of aluminum, newspaper, cardboard, ferrous metals, and batteries; wood chipping; and the re-use of wood, concrete, asphalt, and soil. An on-site methane recovery system, produces 2,500 kilowatts of power (enough to serve 4,000 homes) which is sold to PG&E.

Guadalupe's permitted capacity is 16.5 million cubic yards. As of January 1, 1991, the landfill has a remaining capacity of 14.2 million cubic yards with closure projected for

2013. An expansion of the site was approved in 1990. Proposed use after closure is open space.

A hydrogeologic report for the site was done by EMCON Associates in January 1987, and revised in November 1987. Current operating permits issued to the site include:

- CWMB Solid Waste Facility Permit (#43-AA-001 - June 26, 1979);
- RWQCB Waste Discharge Permit (#77-153 - January 9, 1978); and
- County Land Use Permits (#13 P75.4 - February 18, 1977, and #3463-38-50-88P - June 2, 1988).

3. KIRBY CANYON SANITARY LANDFILL

Kirby Canyon Sanitary Landfill is owned and operated by Waste Management, Incorporated (WMI). WMI has secured a long-term lease from the property owner, Oceanic California, Incorporated. The 827-acre disposal site (327 acres to be used for disposal purposes), opened in July 1986. The landfill presently receives some franchised waste from the City of San Jose, and self-hauled waste from residents of Santa Clara County.

The landfill is located on a hill-face in south San Jose, east of Highway 101 at the Scheller Avenue interchange. The site is bordered by Highway 101 and the Coyote Park open space chain to the west. The land adjacent to the site is designated Non-Urban Hillside and an open space buffer surrounds the entire property. Access is provided from Scheller Avenue.

The Class III landfill accepts only garbage, rubbish, demolition, brush, and stumps for disposal. No hazardous or designated wastes may be accepted.

According to the landfill operator, the facility landfilled 91,408 tons (approximately 137,112 cubic yards) of waste in 1990. The input tonnage is converted to in-place cubic yards by using a compaction factor of 1,400 pounds per cubic yard and a refuse to cover ratio of 1.4 to 1. Tipping fees are \$21.95 per ton (as of January 1991). Public disposal fees are also \$21.95 per ton.

Recently, WMI executed letters of intent with several north county communities to provide long-term disposal capacity. To service these communities (the cities of Sunnyvale, Palo Alto, and Mountain View, surrounding unincorporated areas, and the unincorporated Stanford area), WMI proposes to construct a transfer station in the City of Sunnyvale and is currently involved in negotiations with these communities.

Kirby Canyon's permitted capacity is approximately 24.3 million tons (36.4 million cubic yards). With a remaining capacity of approximately 21.75 million tons (over 32 million

cubic yards), the landfill is expected to remain in operation until at least 2016. A 13-million ton expansion of the landfill is being considered by WMI. Proposed use of the site after closure is open space.

A hydrogeologic report for the site was done by EMCON Associates in July 1983. Current operating permits include:

- CWMB Solid Waste Facility Permit (#43-AN-008 - October 31, 1984);
- RWQCB Waste Discharge Permit (#85-47 - April 30, 1985);
- City of San Jose Land Use Permit (#PD84-5-55 - August 8, 1984); and
- City of San Jose Planned Development Permit (#PD85-7-57 - September 26, 1985).

4. Newby Island Sanitary Landfill

The Newby Island Landfill is owned and operated by International Disposal Corporation, a wholly-owned subsidiary of Browning-Ferris Industries (BFI). The site was opened around 1930 as an open burning dump before being converted to a sanitary landfill in 1956. The facility presently accepts waste from the cities of San Jose, Milpitas, Cupertino, Los Altos, Mountain View, Santa Clara, the Town of Los Altos Hills, surrounding unincorporated areas, independent contractors, and the general public.

Located at the west end of Dixon Landing Road in north San Jose, the 342-acre site is bounded by Coyote Creek on the west, north, and east, and a slough tributary to Coyote Creek on the south. Surrounding land uses include salt evaporation ponds to the west, a wildlife refuge to the north, and sludge beds to the south. The property is zoned R3 - Residential. Access is provided via the Dixon Landing Road interchange off of Interstate 880.

The Class III landfill accepts garbage, rubbish, small dead animals, demolition, brush, stumps, large containers, and street refuse. No hazardous or designated wastes may be accepted.

According to the landfill operator, the facility landfilled 980,477 tons (approximately 4.7 million cubic yards) of waste in 1990. Input tonnage is converted to in-place cubic yards by using a compaction factor of 1,750 pounds per cubic yard and a refuse to cover ratio of 5 to 1. Public disposal fees (as of January 1991) range from \$2.35 to \$17.00 per cubic yard, with a minimum charge of \$12.90 per load. Tipping fees are \$15.05 per ton for franchised waste from the City of San Jose and \$20.50 per ton for franchised waste from Cupertino, Los Altos, Los Altos Hills, Mountain View, and Santa Clara.

In August 1988, a proposed recycling facility, called The Recyclery, received final CoSWMP approval for construction adjacent to the Newby Island Landfill. In early 1991, The Recyclery received final permits and began operations. The Recyclery is capable of processing up to 800 tons of refuse daily, recovering more than half for recycling. The landfill site also has a methane recovery system in place with a design capacity of 2,000 KW.

BFI currently has contracts with the communities of Cupertino, Los Altos, Los Altos Hills, and Santa Clara, and adjacent unincorporated areas, to provide 30 years of disposal capacity. These communities began using the landfill in November 1988. The City of San Jose also has a 30-year contract for disposal capacity at Newby Island. Newby Island has a permitted capacity of approximately 50.8 million cubic yards. With a remaining capacity of approximately 27.1 million cubic yards, and the opening of The Recyclery, the site is expected to remain in operation until at least 2020. Proposed use after closure is as an open space park.

A hydrogeologic report for the site was done by EMCON Associates in 1972 and by Purcell, Rhodes and Associates in 1979 and 1982. Current operating permits issued to the site include:

- CWMB Solid Waste Facility Permit (#43-AN-003 - Feb. 7, 1989); and
- RWQCB Waste Discharge Permit (#75-22, as amended by #82-4, #82-63, #82-64, and #87-152 - November 30, 1987).

5. Santa Clara All Purpose Landfill

The All Purpose Landfill is owned by the City of Santa Clara and operated by the All Purpose Landfill Company. Opened in 1965, the City operated the disposal site until assigning operations to the All Purpose Landfill Company in 1969. The site presently serves the City of Santa Clara.

Located off of Lafayette Street in Santa Clara, the 193-acre site is bounded by San Tomas Aquino Creek to the southwest, the Guadalupe River to the northwest, and highway 237 to the north. Residential housing and an elementary school are located one-half mile southeast of the site. Lafayette Street serves as the immediate haul route to the site. An 800-foot gravel road provides access to the disposal area from Lafayette Street.

The Class III landfill accepts only garbage, rubbish, demolition waste, and tires for disposal. No hazardous or designated wastes may be accepted. According to the landfill operator, the facility landfilled 152,027 tons (approximately 376,234 cubic yards) of solid waste in 1990. Input tonnage is converted to in-place cubic yards by using a compaction factor of 1,200 pounds per cubic yard and a refuse to cover ratio of 3 to 1. Public disposal fees are \$4.75 per cubic yard, with a minimum charge of \$3.35, and tipping fees are \$27.00 per ton (loose) and \$27.80 per ton (compacted), as of January 1991.

The City contracted with Pacific Lighting Energy Systems to construct and operate a landfill-gas collection and conversion system at the landfill. The system has been in operation since 1987. In 1988 at the request of the Bay Area Air Quality Management District, the City installed a stand-by flaring facility that operates when the conversion system does not.

With a remaining capacity of 458,000 cubic yards (as of June 1991), the landfill is expected to remain open until 1993. The landfill site was originally anticipated to provide 260 acres of landfill space. However, commercial development in the area has reduced the total landfill acreage to 193. The City is currently landfilling at the northern portion of the site. Much of the site has been filled, closed, and developed into a municipal golf course. Proposed uses after closure include the continued development of the existing golf course and/or open space.

Hydrogeologic reports for the site were done by United Soil Engineering, Incorporated, on August 6, 1973, and EMCON Associates, in September 1985. Current operating permits issued to the site include:

- CWMB Solid Waste Facility Permit (#43-AO-001 - February 13, 1986); and
- RWQCB Waste Discharge Permit (#763-77 as amended by #85-58, #85-78, #86-15, and #86-66 - August 20, 1986).

6. Sunnyvale Sanitary Landfill

Opened as an open burning dump in the 1920s, the site was converted to a sanitary landfill in 1956. In 1960, the operation of the landfill was taken over by Specialty Garbage and Rubbish Service, Incorporated, under franchise to the City. The facility serves the City of Sunnyvale. The Sunnyvale Sanitary Landfill is owned by the City of Sunnyvale and currently operated by the Oakland Scavenger Company.

Located at the corner of Caribbean Drive and Borregas Avenue in Sunnyvale, the 112-acre site (93 of which are permitted for disposal) is bound by salt evaporation ponds to the north, the Sunnyvale East Storm Drain Channel to the east, Caribbean Avenue to the south, and industrial property to the west. The land, zoned for public facilities, is also the site of the Sunnyvale Water Pollution Control Plant. Surrounding land uses are primarily industrial land and undeveloped baylands areas. Mathilda, Borregas, and Crossman Avenues, and Caribbean Drive all serve as immediate haul routes to the site.

The Class III landfill accepts only residential, commercial, industrial, and demolition wastes as defined by State regulations. No hazardous or designated wastes may be accepted. According to reports filed with the RWQCB, the facility landfilled 159,623 tons of waste in 1990. Public disposal fees range from \$5.17 per cubic yard to \$13.73 per cubic yard.

The drop off recycling center located at the site serves City residents, and also handles the processing of recyclable materials collected by the Sunnyvale and Mountain View

curbside recycling programs. The City has also installed a methane recovery system and is currently flaring the gas collected.

The facility had a remaining capacity of approximately 1.6 million cubic yards (as of January 1, 1990). The landfill is permitted to receive up to 500 tons per day, and averaged 442 tons per day in 1990. The input tonnage is converted to in-place cubic yards by using a compaction factor of 1,456 pounds per cubic yard and a refuse to cover ratio of 1.87 to 1. The facility is expected to reach capacity in April 1994. The proposed use of the site after closure is an open space park.

A hydrogeologic report was done for the site by Cooper and Clark, on May 4, 1976. Current operating permits include

- CWMB Solid Waste Facility Permit (#43-AA-007 - November 17, 1988); and
- RWQCB Waste Discharge Permit (#78-3 as amended by #81-14, and #89-105 - 1989).

7. Zanker Road Disposal and Recycling Center

Zanker Road Disposal and Recycling Center is owned and operated by Zanker Road Resource Recovery, Incorporated, a wholly owned subsidiary of Norcal Waste Systems. Formerly known as the Nine Par Disposal Site, the facility was operated by the Nine-Par Company from 1934 to 1977. Zanker Road Resource Recovery reopened it in 1985. The facility currently serves northern San Jose and surrounding communities.

Located west of the intersection of Zanker Road and Los Esteros Road in northern San Jose, the 70-acre site is bound by a wetland habitat to the north, the Leslie Salt Company evaporation ponds to the north and west, the Artesian Slough to the northwest, the San Jose/Santa Clara Water Pollution Control Plant to the south, and sludge ponds to the east. Access is provided via Los Esteros Road.

The Class III landfill accepts rubbish, brush/stumps, and demolition wastes for disposal. No garbage, hazardous, or designated wastes may be accepted, except asbestos (under certain conditions). According to the landfill operator, the facility landfilled 158,192 tons (263,653 cubic yards) of waste in 1990. Input tonnage is converted to in-place cubic yards by using a compaction factor of 1,200 pounds per in place cubic yard and a refuse to cover ratio of 4 to 1. Public disposal fees are \$3.00 to \$9.00 per cubic yard with a minimum charge of \$9.00.

Zanker Road Resource Recovery conducts extensive recycling activities at the site, accepting incoming recyclable materials and pulling recyclables directly from the wastestream. On average, 80% of the total incoming wastestream is recycled.

The present 46-acre landfill has a permitted capacity of 3.2 million cubic yards. The site has a remaining capacity of 800,000 cubic yards (as of January 1, 1991), and is expected

to remain in operation until 2005. The proposed use after closure is open space.

Hydrogeologic reports were done on the site by William C. Ellis, Consulting Geologist, in June 1975 (reviewed in August 1985), and by Woodward-Clyde. Current operating permits include

- CWMB Solid Waste facility Permit (43-AN-007 - March 7, 1985);
- RWQCB Waste Discharge Permit (#85-132 as amended by #87-032 - May 1, 1987); and
- City of San Jose Land Use Permit (#PD87-1-7 - July 25, 1987).

C. DISPOSAL CAPACITY NEEDS PROJECTION

The disposal facility capacity needs projection provides an estimate of the disposal capacity (in cubic yards/year) that is needed to accommodate projected solid waste for a 15-year period commencing in 1991 (or date of adoption of SRRE). Chapter II of this SRRE describes the projected solid waste generation for this 15 year period. The following formula was used, as required by the California Integrated Waste Management Board, to project the City of Santa Clara's projected capacity needs (expressed in cubic yards) over the next 15 years.

Capacity Needs Projection Equation:

$$\text{Annual Capacity Year } n = [(G + I) - (D + TC + LF + E)] \text{ Year } n$$

where:

- G = The amount of solid waste projected to be generated in the City of Santa Clara. In 1990, the City generated 278,480 tons. Projected growth rate used was 1.1 percent per year.
- I = The amount of solid waste which is expected to be imported to the jurisdiction for disposal in permitted solid waste disposal facilities through inter-jurisdictional agreements with other cities or counties, or through agreements with disposal site owners. There is no solid waste imported into the City for disposal.
- D = The amount of solid waste diverted by implementation of proposed source reduction, recycling and composting programs. The projected source reduction rate used was 0.75 percent per year 1991-1995, and 1.27 percent per year 1986-on. The projected diversions are described in other chapters with prorations used between 1990, 1995, and 2000 when necessary.
- TC = The amount of volume reduction occurring through available, permitted transformation facilities. There were no identified transformation volumes.
- LF = The amount of permitted solid waste disposal capacity which is available for disposal in the jurisdiction, for solid waste generated in the jurisdiction. There is only limited capacity remaining in the City's All Purpose Landfill (approximately 400,000 tons at the beginning of 1991).
- E = The amount of solid waste generated in the jurisdiction which is exported to solid waste disposal facilities in another jurisdiction. The exported amount in 1990 was 108,734 tons to which the 1.1 percent per year growth rate was added until the All Purpose Landfill closed, after which 100 percent of the City's waste is exported.
- n = Each year of a 15-year period commencing in 1991 (or the date of adoption of the SRRE) (iterative in one-year increments)

The above formula can be written as:

$$\begin{array}{l} \text{Capacity} \\ \text{Needed in} \\ \text{Year 1} \end{array} = \begin{array}{l} \text{waste} \\ \text{waste} \\ \text{waste} \\ \text{waste} \\ \text{landfill} \\ \text{waste} \end{array} [(generated + imported) - (diverted + transformed + capacity + exported)]$$

Results of the solid waste disposal facility needs projection are shown in Tables VIII-A and VIII-B. These results indicate that the City of Santa Clara will not require additional disposal capacity during the 15-year planning period. This assumption is not contingent upon the achievement of the AB 939 diversion goals.

D. DISPOSAL FACILITY PHASE-OUT OR CLOSURE

The City's current contract with All Purpose and Newby Island landfills together with achievement of the projected waste diversion goals, will provide adequate disposal capacity through 2019. The All Purpose landfill is expected to reach 100% capacity by 1993. Therefore, the City will not be able to negotiate a new contract with this facility for additional disposal capacity. The City has a current agreement with International Disposal Corp./Browning-Ferris Industries to provide for disposal at the Newby Island landfill through 2019. A partial copy of this agreement is presented in Appendix VIII-A.

E. NEW OR EXPANDED DISPOSAL FACILITIES

None required or proposed during the 15-year planning period due to long-term (through 2019) landfill agreement with IDC/BFI Newby Island Landfill, San Jose, California.

Table VIII-A
City of Santa Clara
Solid Waste Disposal Facility Capacity Needs Projection *

	Solid Waste Generated	Solid Waste Imported	Solid Waste Diverted **	Transformation Reduction	Solid Waste Exported	Remaining Permitted Disposal Capacity In Jurisdiction (end of year)	Additional Disposal Capacity Needed (cubic yards) *
1991	282,053	0	39,487	0	109,930	267,364	0
1992	285,155	0	39,922	0	111,139	133,270	0
1993	288,292	0	40,361	0	114,661	0	0
1994	291,463	0	40,805	0	242,957	0	0
1995	294,669	0	41,254	0	253,415	0	0
1996	297,910	0	41,707	0	256,203	0	0
1997	301,188	0	42,166	0	259,022	0	0
1998	304,501	0	42,630	0	261,870	0	0
1999	307,850	0	43,099	0	264,751	0	0
2000	311,237	0	43,573	0	267,664	0	0
2001	314,660	0	44,052	0	270,608	0	0
2002	318,122	0	44,537	0	273,585	0	0
2003	321,621	0	45,027	0	276,594	0	0
2004	325,159	0	45,522	0	279,637	0	0
2005	328,735	0	46,023	0	282,712	0	0

Note:

* All wastes in tons, except additional disposal capacity.

** Based on current estimated diversion rate of approximately 14% continuing at the same rate for the next 15 years

*** Long-term disposal capacity provided at Newby Island Landfill, San Jose, California.

Table VIII-B
City of Santa Clara
Solid Waste Disposal Facility Capacity Needs Projection *
Considering Assembly Bill 939 Diversion Rates

	Solid Waste Generated	Solid Waste Imported	Solid Waste Diverted **	Tranformation Reduction	Solid Waste Exported	Remaining Permitted Disposal Capacity In Jurisdiction (end of year)	Additional Disposal Capacity Needed (cubic yards) *
1991	282,053	0	54,669	0	109,930	282,546	0
1992	285,155	0	74,231	0	111,139	182,761	0
1993	288,292	0	93,328	0	112,362	100,159	0
1994	291,463	0	98,339	0	92,965	0	0
1995	294,669	0	103,380	0	191,289	0	0
1996	297,910	0	118,475	0	179,435	0	0
1997	301,188	0	134,012	0	167,176	0	0
1998	304,501	0	149,684	0	154,817	0	0
1999	307,850	0	165,292	0	142,558	0	0
2000	311,237	0	181,039	0	130,198	0	0
2001	314,660	0	157,330	0	157,330	0	0
2002	318,122	0	159,061	0	159,061	0	0
2003	321,621	0	160,810	0	160,811	0	0
2004	325,159	0	162,579	0	162,580	0	0
2005	328,735	0	164,367	0	164,368	0	0

Note:

* All wastes in tons, except additional disposal capacity.

** Based on compliance with the SRRE and includes source reduction values. Solid waste diversion after year 2000

*** Long-term disposal capacity provided at Newby Island Landfill, San Jose, California.

APPENDIX VIII-A

**LANDFILL DISPOSAL AGREEMENT BETWEEN
CITY OF SANTA CLARA AND
INTERNATIONAL DISPOSAL CORPORATION**

(For Use of BFI/Newby Island Landfill, San Jose, California)

- Partial Copy -

AGREEMENT FOR DISPOSAL OF
MUNICIPAL SOLID WASTE

(CITY OF SANTA CLARA AND
INTERNATIONAL DISPOSAL CORP.
OF CALIFORNIA [BFII])

TABLE OF CONTENTS

SECTION	PAGE
RECITALS	1
1. DEFINITIONS	1
1.1 Ash	2
1.2 Biomedical Waste	2
1.3 City	2
1.4 Clean Up Campaign	3
1.5 Contractor	3
1.6 Curbside Recycling Credit	3
1.7 Curbside Recycling Program	3
1.8 Debris Box	3
1.9 Designated Hauler	3
1.10 Disposal Facility	4
1.11 Exclusive Franchise Waste	4
1.12 Hazardous Waste	5
1.13 Maintenance Waste	6
1.14 Municipal Solid Waste	6
1.15 Nonexclusive Franchise Waste	7
1.16 Publicly Hauled Waste	7
1.17 Rate Adjustment Date	7
1.18 Recyclery	7
1.19 Recycling	8
1.20 Recycling Incentive Taxes	8
1.21 Regulatory Changes	8
1.22 Residential Waste	8
1.23 Santa Clara County Municipalities	9
1.24 Taxes	9
1.25 Tipping Fee	9
1.26 Ton	10
1.27 Waste-to-Energy Facility	10
2. CITY'S RESPONSIBILITIES	10
2.1 Delivery of Municipal Solid Waste	10
2.2 Waste-to-Energy Facility	10
2.3 Unauthorized Waste	11
3. CONTRACTOR'S RESPONSIBILITIES	11
3.1 Receipt of Municipal Solid Waste	11
3.2 Operational Requirements	11
3.2.1 Hours	11
3.2.2 Signs	12
3.2.3 Site Access	12
3.2.4 Scales, Cubic Yard Conversion	13
3.2.5 Records	13

3.3 Designated Haulers	13
3.3.1 Acceptance of Waste	13
3.3.2 City Designation	13
3.3.3 No Preference	14
3.4 Curbside Recycling Programs	14
3.4.1 Curbside Recycling Credit	14
3.4.2 Contractor Curbside Recycling Program	15
3.5 Unauthorized Waste	16
3.6 Compliance with Laws and Regulations	16
3.7 Permits, Licenses, Approvals	17
3.7.1 Contractor to Obtain	17
3.7.2 Closure Plan	18
3.8 Inspection of Operations	18
3.9 Labor Force	18
3.9.1 Employment	18
3.9.2 Safety Provisions	19
3.10 Discrimination Prohibited	19
4. TERM OF AGREEMENT	19
4.1 Commencement of Performance	19
4.2 Termination	19
5. COMPENSATION	19
5.1 Tipping Fee	19
5.2 Annual Adjustment of Tipping Fee	20
5.3 City Recycle/Transfer Station	22
5.4 Other Adjustments	23
5.4.1 Regulatory Changes	23
5.4.2 Termination by City	24
5.4.3 City's Proportionate Share	24
5.4.4 Taxes	26
5.5 Payment	27
5.5.1 Monthly Invoice and Report	27
5.5.2 Time of City's Payment	28
5.5.3 Payment For Nonexclusive Franchise Waste	28
5.5.4 Payment for Publicly Hauled Waste	28
5.6 Full Payment	29

6.	ASSURANCE OF PERFORMANCE	29
6.1	Force Majeure	29
6.1.1	Events Resulting in Force Majeure. . .	29
6.1.2	Suspension of Obligations	29
6.1.3	Alternative Disposal Arrangements. . .	30
6.2	Performance Bond	31
6.3	Insurance Requirements	31
6.4	Hold Harmless and Indemnification	32
6.4.1	By Contractor	32
6.4.2	By City	33
6.4.3	Negligence Defined	34
6.4.4	Notice and Access	34
6.4.5	Insurance Coverage	35
6.4.6	Survival	35
6.5	Suspension or Termination For Default	35
7.	GENERAL PROVISIONS	
7.1	Independent Contractor.	37
7.2	City Warranty	38
7.3	Venue	39
7.4	Savings Clause	39
7.5	Section Headings	39
7.6	Amendment	39
7.7	Assignability	39
7.8	Notices	40
7.9	Waiver	41
7.10	Law to Govern	41
7.11	Attorney's Fees	41
7.12	Entirety	41
	GUARANTEE	43
	EXHIBITS	
"A"	Equivalent Weight of Municipal Solid Waste	
"B"	Report of Refuse Received at the Recyclery/Newby Island Landfill	
"C"	Insurance Requirements	

AGREEMENT FOR DISPOSAL OF MUNICIPAL SOLID WASTE

THIS AGREEMENT is made and entered into this 7th day of MARCH, 1989, by and between the CITY OF SANTA CLARA, CALIFORNIA, a California municipal corporation (herein "City"), and INTERNATIONAL DISPOSAL CORP. OF CALIFORNIA, a California corporation (herein "Contractor"), which is a wholly-owned subsidiary of Browning-Ferris Industries, Inc., a Delaware corporation.

R E C I T A L S:

WHEREAS, City desires to contract for recycling and long-term disposal of Municipal Solid Waste (as defined herein); and

WHEREAS, Contractor owns and operates the Newby Island sanitary landfill (the "Disposal Facility") and is in the process of establishing a recycling facility thereat; and

WHEREAS, City and Contractor desire that the Disposal Facility be maintained as a fully permitted disposal site in order to receive Municipal Solid Waste from City for recycling and disposal in accordance with this Agreement.

NOW THEREFORE, in consideration of the mutual promises, covenants and conditions contained in this Agreement, and for other good and valuable consideration, the parties to this Agreement hereby agree as follows.

SECTION 1. Definitions.

The following capitalized names and terms shall have the respective meanings indicated:

Waste and Nonexclusive Franchise Waste to the Disposal Facility.

1.10 Disposal Facility

"Disposal Facility" means the Newby Island sanitary landfill, located at 1601 Dixon Landing Road, San Jose, CA 95131.

1.11 Exclusive Franchise Waste

"Exclusive Franchise Waste" means such Municipal Solid Waste which is collected for disposal by Designated Haulers (or possibly, in the future, by City) where the charge for such service is billed directly by City to the customer; provided, however, in the event that the method of waste collection is hereafter modified at any time or from time to time such that any portion of what is now Exclusive Franchise Waste becomes Nonexclusive Franchise Waste or vice versa, then, for purposes of City's obligation under Section 2.1 to deliver or cause delivery of Exclusive Franchise Waste and establishment of the appropriate disposal rate under Section 5.1 and subsection 5.5.3, Municipal Solid Waste generated within what are now residential and commercial (excluding industrial) zoned sectors of City (irrespective of any subsequent zoning changes) shall be deemed to be Exclusive Franchise Waste, and Municipal Solid Waste generated within what are now industrial zoned sectors of City (irrespective of any subsequent zoning changes) shall be deemed to be Nonexclusive Franchise Waste. City shall be obligated to properly establish to Contractor at all times hereafter which Municipal Solid Waste is Exclusive Franchise Waste and Nonexclusive Franchise Waste for purposes hereof.

1.12 Hazardous Waste

"Hazardous Waste" means any of the following:

- (i) all waste defined or characterized as hazardous waste by the federal Solid Waste Disposal Act (42 U.S.C. Section 3251 et seq.), as amended, including the Resource Conservation and Recovery Act of 1976 (42 U.S.C. Section 6901 et seq.) and all future amendments thereto, or regulations promulgated thereunder;
- (ii) all waste defined or characterized as hazardous waste by the principal agencies of the State of California (including without limitation the Department of Health Services and the California Waste Management Board) having jurisdiction over hazardous waste generated by facilities within such State, and pursuant to any applicable State or local law or ordinance, and all future amendments thereto, or regulations promulgated thereunder;
- (iii) radioactive wastes;
- (iv) any sewage sludge or other residue from wastewater treatment facilities;
- (v) waste commonly known as cannery waste;
- (vi) those substances or items which require special or extraordinary handling or disposal due to their hazardous, harmful, toxic or dangerous character or quality; and
- (vii) those substances and items which are not normally expected to be disposed of by generally accepted sanitary landfill disposal methods.

"Hazardous Waste" shall be construed to have the broader, more encompassing definition where a conflict exists in the definitions employed by two or more governmental agencies having concurrent or overlapping jurisdiction over hazardous waste. If any governmental agency or unit having appropriate jurisdiction shall hereafter determine that substances which are not, as of the date hereof, considered harmful, toxic, dangerous or hazardous, are harmful, toxic, dangerous or hazardous, then such substances shall be Hazardous Waste for the purposes of this Agreement as of the effective date of such determination. If any governmental agency or unit having appropriate jurisdiction shall hereafter determine that substances which are, as of the date hereof, considered harmful, toxic, dangerous or hazardous, are not harmful, toxic, dangerous or hazardous, then such substances shall not be Hazardous Waste for purposes of this Agreement as of the effective date of such determination.

1.13 Maintenance Waste

"Maintenance Waste" means the following materials collected by City maintenance employees or private contractors hired to collect such materials instead of such employees: (i) debris from street and sewer repairs, (ii) debris from street sweepings, (iii) grass clippings, leaves and tree trimmings from maintenance of city parks, streets, median strips and City property, (iv) rock and concrete, (v) asphalt pavement from streets and (vi) tree stumps.

1.14 Municipal Solid Waste

"Municipal Solid Waste" means all substances or materials that are generally discarded or rejected as being spent, useless, worthless or in excess to the owners at the time of rejection, including, without limitation, trash, garbage, refuse and rubbish, and which are generated by all

residential, commercial, industrial, institutional, municipal, agricultural and other activities within the City; provided, however, Municipal Solid Waste does not include Hazardous Waste, Biomedical Waste and Ash. Municipal Solid Waste includes Exclusive Franchise Waste, Nonexclusive Franchise Waste and Publicly Hauled Waste.

1.15 Nonexclusive Franchise Waste

"Nonexclusive Franchise Waste" means such Municipal Solid Waste which is collected for disposal by Designated Haulers where the charge for such service is billed directly by the Designated Hauler to the customer; provided, however, that the foregoing shall be subject to the proviso in the definition of Exclusive Franchise Waste.

1.16 Publicly Hauled Waste

"Publicly Hauled Waste" means Municipal Solid Waste generated at residences or commercial establishments in the City and hauled directly to an ultimate disposal site, including the Disposal Facility, by the respective generators (or, in the case of residences, their family members) of such Waste.

1.17 Rate Adjustment Date

"Rate Adjustment Date" has the meaning set forth in Section 5.2.

1.18 Recyclery

"The Recyclery" means a facility for Recycling to be located adjacent to the Disposal Facility, which, when fully operational, is expected to reduce disposable items in selected loads of Municipal Solid Waste delivered to the Disposal Facility.

1.26 Ton

"Ton" means a short Ton of 2,000 pounds avoirdupois.

1.27 Waste-to-Energy Facility

"Waste-to-Energy Facility" means a facility at which waste is burned to produce steam for heat or electricity.

SECTION 2. CITY'S RESPONSIBILITIES

2.1 Delivery of Municipal Solid Waste

Subject to the other provisions of this Agreement, during the term of this Agreement, City shall deliver or cause delivery of all Municipal Solid Waste to the Disposal Facility, for Recycling and/or disposal in accordance with this Agreement; provided, however, City shall not be required to deliver or cause delivery of Municipal Solid Waste collected in Debris Boxes, Municipal Solid Waste collected pursuant to City's Clean Up Campaign, Publicly Hauled Waste, Maintenance Waste, Municipal Solid Waste delivered to a Waste-to-Energy Facility under Section 2.2 or Nonexclusive Franchise Waste (subject to Section 1.11).

2.2 Waste-to-Energy Facility

City may divert Municipal Solid Waste from the Disposal Facility to a Waste-to-Energy Facility; provided, however, that all Municipal Solid Waste which is delivered to, but is for any reason not incinerated at the said Waste-to-Energy Facility, shall be delivered to the Disposal Facility in accordance with Section 2.1. Any diversion of Municipal Solid Waste to a Waste-to-Energy Facility will not change the Tipping Fee at the Disposal Facility for Municipal Solid Waste. City may deliver or cause delivery

of all resulting Ash to the Disposal Facility if regulations and permits allow for disposal of such Ash and subject to a mutually agreeable disposal rate. The price for Ash disposal will be negotiated at the time such a Waste-to-Energy Facility is in the planning phase.

2.3 Unauthorized Waste

City shall use reasonable business efforts to prevent delivery to the Disposal Facility by Designated Haulers of waste or material other than Municipal Solid Waste. Subject to Contractor's agreement, as set forth in Section 3.5, to attempt to reject or have a Designated Hauler remove such other waste or material, City shall pay all costs of handling, demurrage, reloading, transportation and/or disposal of such other waste or material.

SECTION 3. CONTRACTOR'S RESPONSIBILITIES

3.1 Receipt of Municipal Solid Waste

Subject to the other provisions of this Agreement, during the term of this Agreement, Contractor shall receive all Municipal Solid Waste delivered to The Recyclery and the Disposal Facility for Recycling and/or disposal at The Recyclery and Disposal Facility in accordance with this Agreement.

3.2 Operational Requirements.

3.2.1 Hours

Contractor shall operate the Disposal Facility for the receipt of Municipal Solid Waste from the Designated Haulers from at least 6:00 a.m. to 5:00 p.m. Monday through Friday and from 8:00 a.m. to 4:00 p.m. on Saturday, except that the Disposal Facility

3.9.2 Safety Provisions

Contractor shall operate the Disposal Facility in compliance with all applicable federal, state and local laws and regulations pertaining to safety.

3.10 Discrimination Prohibited

In the performance of this Agreement, Contractor will comply with the provisions of the California Fair Employment and Housing Act, California Government Code Section 12900 et seq., as amended, and any regulations promulgated thereunder, and with any federal statutes, and regulations promulgated thereunder, prohibiting employment discrimination.

SECTION 4. TERM OF AGREEMENT

4.1 Commencement of Performance

Performance hereunder shall commence on the date designated by City, but in no event later than April 1, 1989.

4.2 Termination

Unless sooner terminated in accordance with this Agreement, this Agreement shall continue in full force and effect until December 31, 2019.

SECTION 5. COMPENSATION

5.1 Tipping Fee

The Tipping Fee for the disposal of Municipal Solid Waste (other than as specified in subsections 5.5.3 and 5.5.4) at the Disposal Facility (including processing at The Recyclery and ultimate disposal of all processing residue at

- (v) odor, noise and/or dust control due to encroaching land uses around the Disposal Facility which uses were not present on the date of this Agreement.

5.4.2 Termination By City

If, upon any increase in the Tipping Fee under subsection 5.4.1 due to Regulatory Changes, the Tipping Fee (exclusive of Taxes and all adjustments under Section 5.2) exceeds, by thirty percent (30%) or more, the disposal rate (exclusive of taxes and adjustments for inflation) then payable pursuant to the long term disposal contract first entered into by any of the "North County Cities" for disposal of municipal solid waste at the Kirby Canyon Landfill in Santa Clara County, City shall have the option to terminate this Agreement without penalty; provided, however, City must exercise such option, if at all, by providing Contractor with written notice thereof (including written evidence of the aforesaid percentage differential in disposal rates) within sixty (60) days after any such increase in the Tipping Fee. In the event that City properly exercises its aforesaid option, this Agreement shall terminate on the date as of which City has received all necessary regulatory approvals and made all necessary arrangements to process and/or dispose of elsewhere Municipal Solid Waste then being delivered hereunder to the Disposal Facility. As used above, "North County Cities" means the cities of Palo Alto, Sunnyvale and Mountain View, California.

5.4.3 City's Proportionate Share

City's pro rata share of costs attributable to Regulatory Changes under subsection 5.4.1 shall be determined on the basis of either of the following:

- (i) The percentage of the daily volume of wastes disposed of in the Disposal Facility or material processed at the Recyclery, as the case may be, which is attributable to City, for those costs which are, according to generally accepted accounting principles, attributable to the daily operating costs of the Disposal Facility or the Recyclery, as the case may be. The percentage of daily volume attributable to City, shall be based upon the average amounts during the one-year period immediately preceding the request for an adjustment pursuant to this Section; or

- (ii) The percentage of the remaining total site capacity at the Disposal Facility or the percentage of material processed at the Recyclery, as the case may be, which is expected to be utilized by or attributable to City under this Agreement, for those costs which are, by generally accepted accounting principles, not attributable to the daily operating costs of the Disposal Facility or the Recyclery, as the case may be. If costs incurred by Contractor are amortized over several years, the increase in the Tipping Fee shall be repealed at the end of such amortization period. This repeal shall not affect other increases resulting from costs which were not amortized.

Contractor shall notify City of any Tipping Fee adjustment attributable to Regulatory Changes under this Section 5.4 at the earliest practicable time. At the time Contractor makes a request for a Tipping Fee adjustment attributable to Regulatory Changes pursuant to this Section 5.4, Contractor shall submit

5.5.2 Time of City's Payment

City shall review the monthly invoice and the monthly report received from Contractor. City shall have ten (10) working days from receipt of the report to request reasonable additional information regarding the report. Such request shall be in writing and shall specify the information requested. Contractor shall have ten (10) working days from the date of the request to supply to City the requested additional information. City shall remit payment to Contractor with thirty (30) days of receipt of the requested information, or, if no additional information is requested, within thirty (30) days of receipt of the invoice and report. Where City disputes a portion of any invoice, City shall nevertheless timely pay in full the undisputed portion. City shall pay a charge for all past due amounts for each month or part thereof during which such amounts remain unpaid at the prime annual interest rate then established by Chase Manhattan Bank, N.A., but in no event higher than the maximum rate allowed by applicable law.

5.5.3 Payment For Nonexclusive Franchise Waste

Contractor shall accept Nonexclusive Franchise Waste for disposal at the Disposal Facility at a rate which is not more than the general rate then established by Contractor for such type or types of waste. Designated Haulers delivering Nonexclusive Franchise Waste shall make payment directly to Contractor.

5.5.4 Payment for Publicly Hauled Waste

Contractor shall accept Publicly Hauled Waste for disposal and shall require those delivering such

waste to pay directly for disposal at a rate not more than that posted from time to time for deliveries of waste by the general public.

5.6 Full Payment

Contractor hereby agrees to accept payments from City and those delivering Publicly Hauled Waste as described above as full compensation for services rendered under this Agreement.

SECTION 6. ASSURANCE OF PERFORMANCE

6.1 Force Majeure

6.1.1 Events Resulting in Force Majeure

The obligations of City and Contractor are subject to riots, wars, civil disturbances, insurrections, acts of terrorism at the Disposal Facility, epidemics, landslides, hurricanes, earthquakes, lightning, floods, washouts, explosions, fires, acts of God, government orders and regulations and other similar catastrophic events which are beyond the reasonable control of City or Contractor, as the case may be. It is specifically understood that "other similar catastrophic events" does not include, among other things, strikes, lockouts, other labor disturbances or breakage or accidents to machinery, equipment or plants.

6.1.2 Suspension of Obligations

In the event either party is rendered unable, wholly or in part, by the occurrence of any event described in subsection 6.1.1 to carry out any of its obligations, then the obligations of such party, to the

extent affected by such occurrence and to the extent that due diligence is being used to resume performance at the earliest practicable time, shall be suspended during the continuance of any inability so caused but for no longer period. Any time that such a party intends to rely upon the occurrence of an event described in subsection 6.1.1 to suspend obligations as provided in this Section 6, such party shall notify the other party as soon as reasonably possible, setting forth the particulars of the situation. Notice shall again be given when the effect of the occurrence of such event has ceased.

6.1.3 Alternative Disposal Arrangements

In the event that Contractor fails or is unable to accept or dispose of any waste which it is obligated to accept or dispose of under the terms of this Agreement because of any event other than described in subsection 6.1.1 whose occurrence materially and adversely affects Contractor's ability to accept or dispose of such waste at the Disposal Facility, Contractor shall transport and dispose of such waste at an alternate landfill site or disposal facility selected by Contractor at no additional cost to City or in the alternative, at Contractor's option, shall reimburse City for any and all extra costs incurred by City, over and above the Tipping Fee, to haul and dispose of Solid Waste at such other location. Where City hauls or arranges for hauling of said waste, it is understood that these costs may include costs incurred by the City which are payable by it to Designated Haulers for using an alternate landfill site. The provisions of this subsection 6.1.3 shall govern over any conflict with Section 6.5.

6.2 Performance Bond

Contractor shall also make, execute and deliver to City a good and sufficient surety bond in a form reasonably satisfactory to City to secure the faithful performance by Contractor of the terms and conditions herein. Such bond shall be in the penal amount of One Million Seven Hundred Thousand and No/100 Dollars (\$1,700,000.00) and shall be for a term of at least two (2) years. Such bond shall be signed by the President or General Officer of Contractor, together with signature of its corporate secretary and corporate seal. The surety shall be a surety company duly authorized to do business in the State of California and acceptable to City. The surety company which issues the bond shall not be obligated to renew the bond after the expiration of the year term; provided, however, Contractor shall maintain similar replacement bonds issued by a mutually acceptable surety company meeting the requirements set forth above during the term of this Agreement. City agrees that Contractor's failure to replace the bond shall not result in City having any right to make a claim on the expiring bond. Notwithstanding the foregoing, Contractor may at any time, in lieu of the aforesaid surety bond, provide City with a letter of credit in the aforesaid sum, in a form reasonably satisfactory to City, securing the faithful performance by Contractor of the terms and conditions herein.


6.3 Insurance Requirements

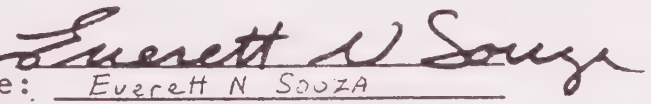
Contractor shall obtain and shall maintain throughout the term of this Agreement at least the minimum insurance policies, with at least the required coverage limits and endorsements, as is set forth in Exhibit "C", entitled "INSURANCE REQUIREMENTS", attached hereto and made a part hereof. The insurance requirements set forth in Exhibit

THE PARTIES TO THIS AGREEMENT hereby indicate their acknowledgment and acceptance of the terms and conditions stated herein by the following signatures of their duly authorized representatives.

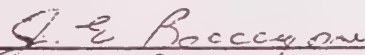
APPROVED AS TO FORM AND LEGALITY:


CITY OF Santa Clara,
California
a municipal corporation

By: 
Name: ROLAND D. PFEIFFER
Title: City Attorney
Assistant

By: 
Name: Everett N. Souza
Title: Mayor

ATTEST:

By: 
Name: J. E. BOCCIONE
Title: City Clerk

By: 
Name: Jennifer Sparacino
Title: City Manager


1500 Warburton Avenue
Santa Clara, California 95050

"City"

ATTEST:

INTERNATIONAL DISPOSAL CORP.
OF CALIFORNIA

By: _____
Name: _____
Title: _____

By: 
Name: Gene A. Meredith
Title: Vice President

55 Almaden Boulevard
San Jose, California 95113
Telephone: (408) 432-1234

"Contractor"

APPROVED AS TO FORM AND
LEGALITY:

APPROVED:

COUNTY OF SANTA CLARA,
CALIFORNIA

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CHAPTER IX FUNDING COMPONENT

INTRODUCTION

Sufficient funding and allocation of resources are critical to the success of the City of Santa Clara's Integrated Waste Management Program. This component describes the funding mechanisms in the City of Santa Clara and provides cost estimates for the current and proposed programs regarding the overall source reduction and recycling elements. Future potential revenue source and contingency revenue sources are also addressed for the short-term planning period.

To address funding issue, the City must demonstrate in this chapter the following:

- Revenue Sources - existing and potential
- Cost estimates for programs scheduled for implementation by 1995
- Evidence of sufficient funding for developing, implementing, and monitoring programs which will meet waste reduction goals
- Sources of contingency funding

A. CURRENT FUNDING SOURCES

This section outlines a variety of factors which affect sources and uses of funds for Integrated Waste Management Program related initiatives. The source of funding for integrated waste management activities in the City of Santa Clara is the General Fund. Basic information will be provided to describe the existing revenue sources which contribute to the General Fund, including the existing rates and fe levels.

Solid waste related revenue sources provide sufficient revenue to the General Fund to fund all Integrated Waste Management programs and recycling initiatives. These sources and their revenue contributions to the General Fund for 1990-91 and 1991-92 are summarized in Table IX-A.

Table IX-A
Revenue Sources for
Integrated Waste Management Programs 1990-1992

Revenue Source	Budget 1990-1991	Budget 1991-1992
1. Customer Charges:		
-Garbage	\$4,680,000	\$5,028,000
-Rubbish	97,000	97,000
2. Non-Exclusive Industrial Hauler Franchise Fees	385,000	400,000
3. Curbside Recycling Credit	193,000	207,000
4. Household Hazardous Waste Charge	110,000	110,000
5. Grants	30,000	15,000
6. AB 939 Fees	0	0
7. Landfill Tipping Fees	0	0
Sub-total	\$5,495,000	\$5,857,000
General Fund *	743,000	640,000
Total	\$6,238,000	\$6,497,000

* Note: Excludes costs/funding for Annual Clean-Up Campaign and street sweeping.

1. Customer Charges

a. Garbage and Refuse Collection and Disposal

Customers, both residential and business, are charged for garbage collection based on quantity collected and collection frequency. The City does the billing and deducts ten percent (10%) for billing and franchise fees. The City pays the garbage collection contractor, recycling collection contractor, household hazardous waste contractor, and the disposal contractor. City Council holds a public hearing and approves rates to be charged customers.

b. City Residential Rubbish Collection Program

The City charges \$0.45 per month to single family residences for an unlimited curbside rubbish collection program which the City operates at a cost of \$4.28 per month per residence. This generates approximately \$97,000 annually. City Council holds a public hearing and approves rates to be charged customers.

2. Non-Exclusive Industrial Hauler Franchise Fees

The City allows approved haulers to bill for, collect, and dispose of refuse from the industrial zoned area of the City. The City charges and collects a franchise fee on the gross billings quarterly. This generated approximately \$385,000 in FY 1990-1991. City Council holds a public hearing and approves rates to be charged.

3. Curbside Recycling Credit From Disposal Contractor

A curbside recycling credit is paid to the City by the Newby Island Landfill operator, IDC/BFI. The current credit in fiscal year 1991-92 is \$0.90 per single family household. This generated approximately \$193,000 in FY 1990-1991. This credit is in place until the Newby Island Recyclery processes the City's residential garbage, which they are not planning to do. If so, 3 years notice must be given to the City.

4. Household Hazardous Waste Charge

A current charge of \$0.21 per month per residence is charged to fund the City's contracted Household Hazardous Waste Drop Off program. This generates approximately \$110,000 annually. City Council holds a public hearing and approves rates to be charged.

5. Grants

Grants have been applied for and received from the Department of Conservation, Division of Recycling and the California Integrated Waste Management Board (CIWMB). The grants from the CIWMB are based on landfill tonnage tax programs. These grants from the CIWMB are funded with landfill-based "ton tax" programs. The City may apply for these grant funds based on the City's refuse tonnages and expenses.

6. AB 939 Fees

The City is allowed to charge fees for implementation of AB 939 programs. In fiscal year 1991-92 the City elected not to do so. A countywide fee implemented in fiscal year 1992-93 would provide new revenue for AB 939 programs.

7. Landfill Tipping Fees

The City allows their leased landfill operator to charge fees which are used to subsidize landfill recovery and recycling programs. City Council holds a public hearing and approves rates to be charged.

8. General Fund

The City could allocate funds from the operating budget's General Fund to pay for solid waste program expenses. City Council has the authority to allocate monies held in the General Fund for use in any program.

B. POTENTIAL FUNDING

1. Flat Rate or Volume-Based User Fees

The Integrated Waste Management Program costs could be put on a flat rate or volume-based system in which fees would be spread over the entire customer base of garbage service recipients. There could be a per-can unit charge which would add incentive for residents and commercial establishments to reduce their trash and garbage costs. The incentive is more effective with a recycling program in place so residents would have an alternative way to dispose of their trash.

In addition, volume-based garbage fees place waste reduction program costs directly on the total waste generation and thereby spread the cost more equally over all generators.

2. Direct Customer Charges

A program expansion would warrant an increase in specific monthly customer charges (for example, the multi-family recycling program costs would only be charged to the multi-family units). The program could be expanded to include more materials which would also generate an increase in revenues, providing that markets for those recyclables are established.

3. Grants

The City can apply for grants from the CIWMB as well as other federal, state, and non-profit organizations such as the U.S. Environmental Protection Agency and the state Department of Conservation's Division of Recycling.

Of particular interest are community development Block Grants. Under the Economic Development Allocation for the Community Development Block Grant Program, local government can receive grants from the state. Monies are then made available by the local governments for businesses to fund specific projects that could involve the use of recycled materials in a manufacturing or entrepreneurial approach.

4. Loans and Financing Assistance

Under a new market development program, the California Pollution Control Financing Authority (CPCFA) is making available taxable loans for manufacturing facilities that use recycled materials. Although there are no limitations for these loans, taxable funding is limited to the useful life of the project.

5. Bonds

Bonds are a reliable source of funding to cover large capital costs of a new program's infrastructure. General Obligation Bonds require two-thirds legislative support by residents. Revenue Bonds are easier for municipalities to obtain because the debt

obligation is paid entirely from revenues generated by the new facility.

6. AB 939 Fee

The City is allowed to charge fees for implementation of AB 939 programs. A countywide system of changing and collecting there type of fees at the landfills is scheduled to be implemented in fiscal year 1992-93. The City can choose to become a part of this program.

7. Landfill Tipping Fees

The City could direct its contracted landfill operator to charge fees on refuse disposed from City sources. These funds could be used to subsidize the City's solid waste programs.

C. REVENUE SOURCES

Some revenue sources are described above under Potential Funding and below under Contingency Funding. In addition, revenue sources are obtained from direct sale of materials.

D. CONTINGENCY FUNDING

Possible contingency funding sources are identified in this section the event that the City's funding sources do not meet program needs or if there is an unforeseen emergency. Contingency funding sources might be obtained from:

- Increase direct user fees, payable by residents or commercial establishments receiving services of a particular recycling program.
- Increase flat rate or volume-based user fees, payable by entire customer base to meet expenses.
- Short-term special taxes or advanced disposal fees on materials which are difficult to recycle such as tires or plastic packaging materials. While the City may not be able to establish taxes, it could more easily establish special user fees (product charges or advanced disposal fees) at the point of sale. These fees would be placed on certain materials or products that have been identified as difficult to recycle or in some other way pose a special disposal problem. As specified by law, these fees would have to be applied only to programs that are designed to alleviate the identified disposal problems.
- Enterprise fund accounts, which have been established in many cities to generate revenues through a charge on the trash handling process (e.g. tipping fees or household garbage rates). The account can only fund projects that are directly related to garbage handling or waste reduction efforts, and would not be part of the City's general fund.
- Rollover of unspent funds from the City's general account or special waste management funding accounts which can be established under the AB 939 regulations.
- Use of other potential funding sources (grants, loans, bonds, etc.)

E. IMPLEMENTATION COSTS

Costs to implement programs to meet the 25 percent diversion goal are shown in Table IX-B. These different selections and specific recommendations are further described in Chapter X, Integration.

The City will use the following methods to raise revenues to fund the new programs described for the short-term period:

1. Customer Charges - increase both residential and commercial rates for garbage collection
2. Household Hazardous Waste Customer Charge - increase if necessary to fund program
3. AB 939 Fees - new fees charged at landfills countywide
4. Grants - continue to apply for grants to fund the City's household hazardous waste and recycling program.
5. Landfill Tipping Fees - specific charge for specific material to be recovered and recycled.
6. General Fund - increase use of City's General Fund monies (*)

Based on the magnitude of the costs for the identified programs for the short-term, there are sufficient revenue sources available. The increases associated with the programs proposed are not excessive.

The primary funding mechanisms utilized will be direct customer charges and General Fund monies available July 1st of each fiscal year. AB 939 fees and grants are to be considered supplemental offset funding to expenditures funded through the primary funding mechanisms. Direct customer charges and General Fund usage would be adjusted in arrears to expenditures and receipt of AB 939 fees and grants to reflect the amount received from these supplemental sources. Landfill tipping fees would be in place prior to commencement of the program.

*** NOTE:**

In approving the Final Draft, the Santa Clara City Council went on record as opposing the use of General Fund source funding for new programs. City Council also went on record stating that if the AB 939 funding authority allowing local jurisdictions to raise funds through AB 939 fees is eliminated that programs funded with these fees would be discontinued.

Table IX-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
A. SOURCE REDUCTION								
1. Backyard Composting Promotion and Education (2)	GF	\$0	FY 93-94	\$0	\$0	\$500	\$500	\$500
2. Business and Consumer Education Programs (2)	GF	\$0	FY 92-93	\$0	\$2,000	\$4,000	\$4,000	\$4,000
3. Awards and Public Recognition (2)	GF	\$0	FY 91-92	\$500	\$500	\$500	\$500	\$500
4. Expansion of City Offices Source Reduction Program (2)	GF	\$0	FY 91-92	\$250	\$250	\$250	\$250	\$250
5. Request for Commercial Waste Reduction Plans (2)	GF	\$0	FY 93-94	\$0	\$0	\$1,250	\$1,250	\$1,250
6. Program Evaluations of Variable Can Rate (4)	GF	\$0	FY 95-96	\$0	\$0	\$0	\$0	note (4)
7. Procurement Policy and Legislative Support (4)	GF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)

Table IX-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
B. RECYCLING								
1. Expand Residential Curbside Recycling Program Materials (5)	DC, AB	\$0	FY 91-92	note (5)	note (5)	note (5)	note (5)	note (5)
2. Expand Multi-Family Residential Recycling Program (8)	DC, AB	\$0	FY 92-93	\$0	\$20,000	\$20,000	\$20,000	\$200,000
3. Legislative Support (4)	GF	\$0	FY 92-93	note (4)	note (4)	note (4)	note (4)	note (4)
4. Market Development (2)	GF	\$0	FY 93-94	\$0	\$0	\$500	\$500	\$500
5. City Office Recycling Program Expansion (2)	GF, AB	\$0	FY 92-93	\$0	\$500	\$500	\$500	\$500
6. Awards and Public Recognition Program (8)	AB, GF	\$0	FY 91-92	\$500	\$500	\$500	\$500	\$500
7. Voluntary Submission of SRRE By Businesses (2)	GF	\$0	FY 93-94	\$0	\$0	\$2,000	\$2,000	\$2,000
8. Evaluate Planning and Building Code Modifications (4)	GF	\$0	FY 94-95	\$0	\$0	\$0	note (4)	note (4)
9. Evaluate Feasibility of Quantity-Based User Fees (4)	GF	\$0	FY 95-96	\$0	\$0	\$0	\$0	note (4)
10. Promote Commercial Recycling (2)	GF	\$0	FY 91-92	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000

Table IX-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96

C. COMPOSTING

1. Residential Yard Waste/Rubbish Collection Program (4)	GF, DC	\$0	FY 93-94	\$0	\$0	\$0	note (4)	note (4)
2. Support Programs								
a. Marketing (2)	GF, AB	\$0	FY 92-93	\$250	\$250	\$500	\$500	\$500
b. Public Education (2)	GF, AB	\$0	FY 91-92	\$250	\$250	\$5,000	\$5,000	\$5,000
c. Feasibility Studies (2)	GF, AB	\$0	FY 95-96	\$0	\$0	\$0	\$0	\$0

D. SPECIAL WASTES

1. Abandoned Vehicle Abatement Program (2)	GF	\$0	FY 91-92	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
2. Divert Tires from Landfill (6)	LF	\$0	FY 91-92	\$50,000	\$100,000	\$150,000	\$200,000	\$300,000
3. Process White Goods (6)	LF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)

Table IX-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
E. HOUSEHOLD HAZARDOUS WASTE								
1. Periodic Drop-Off Events (2)	DC, G	\$0	FY 91-92	\$130,000	\$130,000	\$130,000	\$130,000	\$130,000
2. Mobile & Permanent Drop-Off Facility – Countywide Program Santa Clara Participation (2)	DC, G	\$0	FY 91-92	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
3. Curbside Used Motor Oil Collection Program (2)	DC, G	\$0	FY 91-92	\$23,000	\$23,000	\$23,000	\$23,000	\$23,000
4. Hazardous Waste Exclusion Program at Landfill (2)	GF	\$0	FY 91-92	note (4)	note (4)	note (4)	note (4)	note (4)
5. HHW Recycling		\$0	(Cost included in item 1 and 2 above)					
F. PUBLIC EDUCATION & INFORMATION		\$0	FY 91-92	(Costs included in other elements)				

Table IX-B
Program Costs for the City of Santa Clara Short-Term (1991-1992)

Programs	Funding Mechanisms	Capital Costs	Year Implemented	Operating Costs				
				FY 91-92	FY 92-93	FY 93-94	FY 94-95	FY 95-96
G. TOTALS								
Sub-total Current Funded Programs		\$0		\$229,250	\$281,750	\$343,000	\$393,000	\$493,000
Sub-total New Programs (unfunded)		\$0		\$500	\$20,500	\$20,500	\$20,500	\$200,500
Grand Totals		\$0		\$229,750	\$302,250	\$363,500	\$413,500	\$693,500

NOTES:

1. Costs are shown only for new and expanded programs identified in Sections III through VIII (Costs in 1991 dollars).
2. Costs included in City's General Fund Operating Budget for FY 1991-92.
3. Capital costs are not amortized.
4. Included in City's General Fund Operating Budget prior to FY 1991-92.
5. Operating costs are included in existing curbside operation program.
6. Included in landfill tipping fees.
7. Funding source availability schedule is July 1 each fiscal year for the funding mechanism noted. Exceptions are grants and AB 939 fees which are considered supplemental offset funding to Direct Charges and General Fund mechanisms which are typically received after the expenditures.
8. Countywide AB939 beginning FY 92-93

FUNDING MECHANISM LEGEND:

AB = AB 939 per ton charge at landfill on City disposed refuse.

B = Bonds

DC = Direct charge to customer receiving service

G = Grants

GF = General Fund

L = Loans

LF = Landfill tipping charge by landfill operator

UF = User fees spread over entire refuse collection charge rate base

CHAPTER X INTEGRATION COMPONENT

INTRODUCTION

This chapter describes how the City of Santa Clara will integrate solid waste management practices to achieve the diversion requirements specified in AB 939, the California Integrated Waste Management Act. First, priorities among component alternatives must be determined which conform to the integrated waste management hierarchy of: 1) Source Reduction; 2) Recycling and Composting and; 3) Environmentally-Safe Transformation and Disposal. Concluding this chapter is a schedule which anticipates dates of achievement of the required solid waste diversion mandates.

The City of Santa Clara currently diverts approximately 14 percent of the solid waste generated in the city from disposal through existing diversion programs. In addition to these programs, the City of Santa Clara has a large number of alternative programs available for reducing its wastestream. State regulations for preparation of Source Reduction and Recycling Elements (SRRE) have divided these into five broad categories:

- Source reduction
- Recycling
- Special Reduction programs
- Composting
- Public education

A. INTEGRATED SOLID WASTE MANAGEMENT PRACTICES

This report focuses on activities and programs which are to be continued, expanded, or implemented in the City of Santa Clara, and are designed to comply with the integrated waste management hierarchy established by AB 939. These programs were chosen because they are expected to provide the largest waste diversion for the least cost in the short-term. A more detailed summary of these actions follow this brief outline.

1. Source Reduction

Continuing and expanding current programs and starting new source reduction measures.

2. Recycling

- a. Expansion of residential curbside recycling program to include multi-family.
- b. Expand materials collected through residential curbside.
- c. Commercial programs to include office paper recycling, cardboard collection, and glass collection at bars and restaurants.
- d. Recycling of special/other wastes including construction debris, wood waste, white goods, small appliances, and more.

3. Composting

- a. Yard waste drop-off center at transfer station.
- b. Curbside collection of yard waste.
- c. Food processing composting.

B. COMPONENT PRIORITIES

Table X-A summarizes short-term program goals. The table shows in tons per year and percent of waste generated in each of the three main categories: source reduction, recycling, and composting. For the short-term, by 1995, these programs are expected to divert more than the required 25 percent of the wastestream. In the medium-term, by the end of year 1999, planned programs are expected to exceed the 50 percent diversion goal.

The following summary describes specific features of each new or planned program expansion while explaining how much diversion is expected from each component. General cost ranges are described in this section but specific costs for each program are shown in Chapter IX, Funding.

1. Source Reduction

The City's existing source reduction activities will be increased through consideration of a rate structure modification, economic incentives and technical assistance including to industry and consumer organizations including waste audits. A vigorous public education program will boost overall awareness of source reduction issues and the concept of reuse will be emphasized.

While these measures are difficult to quantify, source reduction activities are expected to bring up to 0.8 percent diversion by the end of the short-term planning period.

2. Recycling

a. Residential Curbside Collection

The City has an existing curbside recycling program that collects newspaper, glass, aluminum and tin cans, plastics (PET), and used oil. The City recovered

over 3,275 tons (including 71.0 tons of used motor oil) in 1990 which contributed about 1.2 percent (3,204 tons) to the City's diversion goal. Its current operation costs are funded through the landfill disposal credit agreement.

While a small portion of the city's multi-family units are currently being served, this program is proposed to expand service to all multi-family units and builds the combined residential programs to a "potential" diversion rate to 2.5 percent by the end of the short-term.

Other materials are to be collected as well. The existing curbside recycling program is to be expanded to collect corrugated cardboard (OCC), magazines, all PET and HDPE in 1992. Adding it to the regular program will not increase collection costs substantially.

b. Recycling Centers

Currently, the City is served by six buy-back recycling centers plus six certified redemption centers in shopping malls where residents where residents can redeem their beverage containers.

c. Commercial Recycling

Combined commercial and industrial wastes account for approximately 76 percent of Santa Clara's disposed waste. This source shows the greatest potential for reaching the 25 percent mandated waste diversion goal by the end of 1994.

Currently, there is no regular City collection of cardboard (OCC) from commercial businesses in the City, although some stores recycle OCC in-house and some are contracting with private collectors to recycle this material. With OCC comprising over 16 percent of commercial wastes, encouraging recycling of this material would be a large step to meeting the diversion goals.

Many communities in the Bay Area have a "bars and restaurants" glass collection program serving the business sector. Normally, special barrels or bins are provided to each establishment for color-sorted glass bottles and jars. Small crushers are also available where storage space may be a problem.

Larger office (100+ employees), generally have office paper (usually computer paper) recycling programs in place. Efforts to expand these, particularly those in large office buildings, and include a variety of materials; glass and cans, and a range of separated office paper grades, would have a significant impact.

It is proposed, for the short-term, to encourage and promote businesses and the private collection/recycling industry to take the necessary steps to increase the recycling and diversion rates to meet the City's goals. If these goals are not being met, mandatory requirements and programs will be implemented.

3. Special/Other Wastes

a. Disposal Site Recovery - Wood Waste

Another large portion of the wastestream is comprised of waste wood; pallets, crates and construction debris. While some of this material is currently recovered, most is still landfilled. Currently, wood waste accounts for 7.6 percent of all the City's disposed waste.

Recovery of wood waste at the landfill and materials recovery stations could provide up to 7.6 percent diversion at a relatively low cost, but since the wood is used as fuel, its diversion can not be counted until after the City has met its 25 percent goal.

b. Disposal Site Recovery - Construction Debris

Similar to wood waste is debris from construction and demolition (C&D) activities which can be separated at the disposal site. C&D debris comprises 2.7 percent of the wastestream and is mostly inert materials; concrete, asphalt, rock and dirt.

These materials can be sorted and crushed for re-use in aggregate and other construction projects. Operation costs would be low-to-moderate on a per ton basis, while producing high diversion levels for an aggressive program.

c. Other Programs

This category includes all existing recycling programs in the City not included above. The City of Santa Clara has in-house recycling programs, such as OCC recycling, which are run by grocery and department stores, and manufacturing companies.

The costs for collection and processing would be low-to-high, depending on the particular material targeted and program design. The existing diversion rate of 14 percent is probably lower than actual levels since not all of the City's businesses and institutions were surveyed.

4. Composting

Yard Waste - Curbside Collection: A program with separate weeks for collection of yard waste could provide the single largest diversion for the City's residents. Yard waste comprises 11 percent of the City's total wastes and 28 percent of the single-family residential wastestream. By making the rules more restrictive, the City's Rubbish Collection Program should be converted to a yard waste collection program that could achieve a 1.8 percent diversion of the total City wastes in the short-term.

In this program, yard waste, brush and tree trimmings, leaves and grass only would be collected on alternate weeks, and processed (ground and screened) for composting or mulching. The final material would be sold or given to local users as these markets are developed.

Collection costs would be lower because the amount of materials set out would be reduced, but processing costs for preparation and composting would likely be higher.

C. INTEGRATED SCHEDULE

The integrated schedule for the short-term planning period, shown in Table X-A, includes all implementation tasks described above for new and expanded programs, and identifies the agency responsible for implementation. Programs to meet waste diversion goals scheduled for the medium-term would expand from those programs initially implemented in the short-term planning period.

As shown in Table X-B, the City is expected to exceed the 25 percent short-term goal, if all programs are implemented on schedule. Likewise, the medium-term goal of 50 percent will also be met assuming this plan's programs are implemented as described and estimated recycling percentages are achieved.

Table X-A

**Short-Term Integration Schedule for
the City of Santa Clara**

Component	Responsible Agency	Implementation Date (Fiscal Year)	
		Start	Complete
Source Reduction	City	1991	1995
Recycling			
Continue Existing Programs	All Parties	1991	1995
Expand Residential Curbside	City/Hauler	1992	1995
Expand Multi-Family Service	City/Hauler	1992	1995
Legislative Support/Market Development	City	1991	1995
Expand City Office Recycling Program	City	1991	1995
Awards and PR Program	City	1991	1995
Voluntary Submission of SRRE by Businesses	Businesses	1993	1995
Code Modifications	City	1992	1995
Evaluate User Fees	City	1994	1995
Promote Commercial Recycling	City	1991	1995
Composting			
Residential Curbside Collection – Yard/Wood Waste	City	1993	1995
Landfill/Private Site Drop-off & PR Program	All parties	1991	1995
Encourage Regional Compost Facilities	City	1992	1995
Encourage Compost Marketing Programs	City	1993	1995
Special Wastes			
Continue Existing Programs	All parties	1991	1995
Divert Tires from Landfilling	All parties	1991	1995
Process White Goods	All parties	1992	1995

Note:

Funding source availability schedule is July 1 each fiscal year. See Section IX for details. Each program will be implemented in the first quarter of the fiscal year noted and will be completed by the end of the fourth quarter of the fiscal year noted.

TABLE X-B (pg. 1 of 3)

CITY OF SANTA CLARA: 1990 DIVERSION

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

MATERIAL		residential curbside	multi-family curbside	city offices	composting	buyback and 20/20	drop off	commercial on-site	landfill salvaging	richard ave	newby	zanker	TOTAL DIVERTED	TONS LANDFILLED	TOTAL MSW	DIVERSION PERCENTAGE
PAPER	OCC	0.00	0.00	0.00	0.00	0.00	0.00	3,693.00	583.92	0.00	0.00	0.00	4,276.92	33,406.55	37,683.47	11.35%
	MIXED PAPER	0.00	0.00	0.00	0.00	0.00	0.00	174.40	0.00	0.00	0.00	0.00	174.40	23,861.82	24,036.22	0.73%
	NEWSPAPER	2,108.00	0.00	0.00	0.00	0.00	196.60	270.00	0.00	0.00	0.00	0.00	2,574.60	9,067.49	11,642.09	22.11%
	HIGH GRADE	0.00	0.00	18.00	0.00	0.00	0.00	2,442.80	0.00	0.00	0.00	0.00	2,460.80	7,874.40	10,335.20	23.81%
	OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00	40.00	15,510.18	15,550.18	0.26%
PLASTICS	HDPB	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,579.27	3,579.27	0.00%
	PEI	19.00	0.00	0.00	0.00	5.60	1.00	33.00	2.53	0.00	0.00	0.00	61.13	238.62	299.75	20.19%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	38.30	0.00	0.00	0.00	0.00	38.30	11,215.06	11,253.36	0.34%
GLASS	CAL REDEMPTION	531.60	0.00	0.00	0.00	246.00	11.00	480.00	31.08	0.00	0.00	0.00	1,299.68	2,624.80	3,924.48	33.12%
	REFILLABLE	0.00	0.00	0.00	0.00	0.00	0.00	16.80	0.00	0.00	0.00	0.00	16.80	1,193.09	1,209.89	1.39%
	OTHER RECYCLABLE GLASS	354.60	0.00	0.00	0.00	2.00	0.00	160.00	0.00	0.00	0.00	0.00	516.60	1,908.95	2,425.55	21.30%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.62	238.62	0.00%
METALS	ALUMINUM CANS	33.00	0.00	0.00	0.00	211.00	1.00	31.00	109.97	0.00	0.00	0.00	385.97	477.24	863.21	44.71%
	TIN CANS	90.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	1,431.71	1,521.71	5.91%
	FERROUS	0.00	0.00	63.00	0.00	0.00	0.00	2,518.60	311.90	0.00	0.00	0.00	2,893.50	8,590.26	11,483.76	25.20%
	NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	38.50	0.00	0.00	0.00	0.00	38.50	477.24	515.74	7.47%
	BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.86	23.86	0.00%
GREEN WASTE	GREEN WASTE/COMPOST	68.00	0.00	0.00	0.00	0.00	0.00	258.00	0.00	0.00	0.00	0.00	326.00	26,486.62	26,812.62	1.22%
OTHER ORGANICS	FOOD	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	20.00	21,952.88	21,972.88	0.09%
	WOOD	0.00	0.00	0.00	0.00	0.00	0.00	4,802.60	0.00	0.00	0.00	0.00	4,802.60	18,134.99	22,937.59	20.94%
	TEXTILES/LETH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,193.09	1,193.09	0.00%
	TIRES/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	16.00	0.00	0.00	0.00	0.00	16.00	6,442.69	6,458.69	0.25%
	AG. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.62	238.62	0.00%
OTHER COMPACTED WASTES	WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	172.00	0.00	0.00	0.00	0.00	172.00	1,193.09	1,365.09	12.60%
	DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,670.33	1,670.33	0.00%
	HHW *	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,533.75	4,533.75	0.00%
	OTHER	0.00	0.00	3.62	0.00	0.00	0.00	13.10	0.00	0.00	0.00	0.00	16.72	27,441.10	27,457.82	0.06%
UNCOMPACTED	INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,199.00	0.00	0.00	0.00	18,199.00	9,054.69	27,253.69	66.78%
TOTALS		3,204.20	0.00	84.62	0.00	464.60	209.60	15,218.10	19,238.40	0.00	0.00	0.00	38,419.52	240,061.00	278,480.52	13.80%

* HHW does not include motor oil, battery, and misc. HHW diversion of 416.78 tons in Total Diverted and Total MSW.

**CITY OF SANTA CLARA: 1995 WASTE GENERATION
AND RECYCLING TONNAGES**

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

TABLE X-B (pg. 2 of 3)

MATERIAL		residential curbside	multi-family curbside	city offices	HHW	composting	buyback/ 20/20	drop off	commercial on-site	concrete/ asphalt	richard ave	newby	zanker	TOTAL DIVERTED	TONS R LANDFILLED	TOTAL MSW	DIVERSION PERCENT
PAPER	OCC	781.50	920.60	0.00	0.00	0.00	0.00	0.00	4,077.85	0.00	6,336.05	4,336.00	2,191.20	18,643.20	19,158.61	37,801.81	49.32%
	MIXED PAPER	355.23	943.00	0.00	0.00	0.00	0.00	20.00	96.60	0.00	3,282.53	51.05	1,135.20	5,883.61	18,540.87	24,424.48	24.09%
	NEWSPAPER	2,145.94	646.00	0.00	0.00	0.00	0.00	200.14	298.08	0.00	858.80	157.08	0.00	4,306.04	7,554.75	11,860.79	36.30%
	HIGH GRADE	0.00	0.00	19.87	0.00	0.00	0.00	0.00	2,695.97	0.00	1,545.84	226.97	534.60	5,023.25	5,506.60	10,529.84	47.70%
	OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.16	0.00	0.00	1.20	0.00	45.36	15,800.37	15,845.73	0.29%
PLASTICS	HDPE	213.00	174.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	610.70	7.03	211.00	1,215.73	2,644.58	3,860.31	31.49%
	PET	20.06	46.60	0.00	0.00	0.00	5.70	1.02	36.43	0.00	38.17	0.10	15.00	163.08	140.45	303.53	53.73%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	113.90	0.00	113.90	11,314.34	11,428.24	1.00%
GLASS	CAL REDEMPTION	541.17	303.00	0.00	0.00	0.00	250.43	11.20	529.92	0.00	400.78	5.00	0.00	2,041.50	1,924.63	3,966.13	51.47%
	REFILLABLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	603.60	0.00	95.42	1.00	0.00	700.02	1,117.91	1,817.93	38.51%
	OTHER RECYCLABLE	360.78	0.00	0.00	0.00	0.00	2.04	0.00	176.64	0.00	286.26	2.00	0.00	827.72	1,643.21	2,470.93	33.50%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	243.15	243.15	0.00%
METALS	ALUMINUM CANS	33.59	52.44	0.00	0.00	0.00	214.80	1.02	34.22	0.00	57.25	2.00	0.00	395.32	371.96	767.28	51.52%
	TIN CANS	91.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	229.01	0.86	0.00	321.49	1,229.06	1,550.54	20.73%
	FERROUS	0.00	0.00	69.55	0.00	0.00	0.00	0.00	1,974.61	0.00	1,774.85	82.82	0.00	3,901.83	6,742.06	10,643.89	36.66%
	NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.50	0.00	0.00	0.00	0.00	42.50	483.00	525.50	8.09%
	BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.32	24.32	0.00%
GREEN WASTE	GREEN WASTE	69.20	0.00	0.00	0.00	10,000.00	0.00	0.00	284.83	0.00	0.00	621.00	0.00	10,975.03	16,346.91	27,321.94	40.17%
ORGANICS	FOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22,370.17	22,370.17	0.00%
	WOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,302.07	0.00	3,530.63	6,748.00	1,221.00	16,801.70	6,567.05	23,368.75	71.90%
	TEXTILES/LTHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,215.77	1,215.77	0.00%
	TIRES/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.66	0.00	0.00	0.00	0.00	17.66	6,563.78	6,581.45	0.27%
	AG. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.08	0.00	0.00	0.00	0.00	22.08	241.45	263.53	8.38%
OTHER COMPACTED WASTES	WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	189.88	0.00	0.00	0.00	0.00	189.88	1,200.98	1,390.86	13.65%
	DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,702.08	1,702.08	0.00%
	HHW*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,630.00	3,630.00	0.00%
	OTHER	0.00	0.00	4.00	0.00	0.00	0.00	0.00	1.10	0.00	0.00	293.00	0.00	298.10	29,833.20	30,131.30	0.99%
UNCOMPACTED	INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,596.00	1,190.87	0.00	411.84	20,198.71	7,177.45	27,376.16	73.78%
TOTALS		4,612.10	3,085.64	93.42	36.12	10,000.00	472.96	233.37	16,428.22	18,596.00	20,237.16	12,648.99	5,719.84	92,127.70	191,288.70	283,416.39	32.51%

Percent of
msw diversion

1.6% 1.1% 0.0% 0.0% 3.5% 0.2% 0.1% 5.8% 6.6% 7.1% 4.5% 2.0%

percent of
subwastestream
diversion

13.0% 13.2% 0.0% 0.0% 28.2% 0.8% 0.4% 8.2% 9.3% 10.1% 6.3% 2.9%

* HHW does not include motor oil, battery, and misc. HHW diversion 483.61 tons in Total diverted and Total MSW.

TABLE X-B (pg. 3 of 3)

CITY OF SANTA CLARA: 2000 WASTE GENERATION AND RECYCLING TONNAGES

MATERIALS DIVERTED (TONS) AND RECYCLING RATES (%)

MATERIAL		residential curbside	multi-family curbside	city offices	HHW	composting	buyback/ 2020	drop off	commercial on-site	concrete/ asphalt	richard ave	newby	zanker	Total Diverted	Tons R Landfilled	Total MSW	Diversion Percent
PAPER							0.00	0.00	9,500.00	0.00	7,347.68	11,825.00	2,099.70	32,460.26	4,964.04	37,424.31	86.74%
	OCC	775.25	912.64	0.00	0.00	0.00	0.00	40.00	7,500.00	0.00	3,806.63	3,060.00	1,121.00	16,814.80	7,140.70	23,955.50	70.19%
	MIXED PAPER	352.16	935.01	0.00	0.00	0.00	0.00	198.54	1,900.00	0.00	995.82	801.00	0.00	6,664.92	5,011.61	11,676.53	57.08%
	NEWSPAPER	2,128.73	640.83	0.00	0.00	0.00	0.00	0.00	2,000.00	0.00	1,664.61	1,440.00	475.90	5,600.74	4,975.70	10,576.43	52.95%
	HIGH GRADE	0.00	0.00	20.23	0.00	0.00	0.00	0.00	550.00	0.00	0.00	1.19	0.00	551.19	14,975.25	15,526.45	3.55%
	OTHER PAPER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
PLASTICS																	
	HDPB	211.30	172.52	0.00	0.00	0.00	0.00	1.01	100.00	0.00	44.26	36.00	12.50	265.55	35.63	301.18	88.17%
	PET	19.90	46.23	0.00	0.00	0.00	0.00	0.00	2,000.00	0.00	0.00	114.00	0.00	2,114.00	9,080.88	11,194.88	18.88%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
GLASS																	
	CAL REDEMPTION	536.84	300.58	0.00	0.00	0.00	248.43	11.11	1,000.00	0.00	464.76	1,190.00	0.00	3,751.72	194.66	3,946.38	95.07%
	REFILLABLE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	500.00	0.00	110.66	178.00	0.00	788.66	1,005.89	1,794.55	43.95%
	OTHER RECYCLABLE	357.89	0.00	0.00	0.00	0.00	2.02	0.00	800.00	0.00	331.97	534.00	0.00	2,025.88	416.18	2,442.06	82.96%
	OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.19	238.19	0.00%
METALS																	
	ALUMINUM CANS	33.32	52.00	0.00	0.00	0.00	213.08	1.01	150.00	0.00	66.40	107.00	0.00	622.81	135.21	758.01	82.16%
	TIN CANS	90.89	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	265.58	214.00	0.00	680.47	839.56	1,520.02	44.77%
	FERROUS	0.00	0.00	76.80	0.00	0.00	0.00	0.00	6,000.00	0.00	2,058.23	1,104.00	0.00	9,239.03	1,387.19	10,626.22	86.95%
	NON-FERROUS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	150.00	368.88	518.88	28.91%
	BI-METAL CONT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.82	23.82	0.00%
GREEN WASTE	GREEN WASTE	69.08	0.00	0.00	0.00	18,800.00	0.00	0.00	3,000.00	0.00	0.00	621.00	0.00	22,490.08	4,302.81	26,792.89	83.94%
ORGANICS																	
	FOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21,913.39	21,913.39	0.00%
	WOOD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,000.00	0.00	3,801.88	7,138.00	1,217.54	18,157.42	5,247.01	23,404.43	77.58%
	TEXTILES/ATHR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,190.95	1,190.95	0.00%
	TIRES/RUBBER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	3,000.00	3,448.77	6,448.77	46.52%
	AG. CROP	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
	MANURE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	100.00	160.27	260.27	38.42%
OTHER COMPACTED WASTES																	
	WHITE GOODS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	700.00	680.83	1,380.83	50.69%
	DIAPERS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,667.32	1,667.32	0.00%
	HHW*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,007.11	4,007.11	0.00%
	OTHER	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	345.00	0.00	349.00	29,270.89	29,619.89	1.18%
UNCOMPACTED	INERT SOLIDS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18,090.00	1,282.37	1,115.00	409.80	20,897.17	6,601.86	27,499.03	75.99%
TOTALS		4,575.35	3,059.80	101.02	36.12	18,800.00	469.18	251.67	46,060.00	18,090.00	22,949.05	30,393.19	5,545.04	150,294.31	130,198.09	280,492.40	53.58%
Percent of msw diversion		1.6%	1.1%	0.0%	0.0%	6.7%	0.2%	0.1%	16.4%	6.4%	8.2%	10.8%	2.0%				
percent of subwastestream diversion		12.9%	13.1%	0.1%	0.0%	52.9%	0.8%	0.4%	23.0%	9.0%	11.4%	15.2%	2.8%				

*HHW does not include motor oil, battery, and misc. HHW diversion of 1002.59 tons in Total Diverted and Total MSW.

U.C. BERKELEY LIBRARIES



C124911368

